CLASS VI

SAMPLE PAPER 01 FOR SESSION ENDING EXAM (2019-20)

SUBJECT: MATHEMATICS **MAX. MARKS : 80**
CLASS : VI **DURATION : 3 HRS**

General Instruction:
(i) All the questions are compulsory.
(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.
(iv) Use of calculators is not permitted.

SECTION – A

1. How many factors does 36 has

   (a) 7 (b) 9 (c) 10 (d) 8

2. $30 + 6 + \dfrac{2}{10}$ can be written in decimal form as

   (a) 3062 (b) 362 (c) 36.2 (d) none of these

3. Fill in the boxes with the correct symbol: $\dfrac{1}{2} \boxed{} \dfrac{3}{2}$

   (a) > (b) < (c) = (d) none of these

4. The ratio of 98 to 63 is _____
   (a) 14 : 5 (b) 9 : 14 (c) 5 : 14 (d) 14 : 9

5. The tally mark 𝍷𝍷𝍷𝍷𝍷 𝍷𝍷𝍷𝍷𝍷 frequency is _____
   (a) 6 (b) 5 (c) 10 (d) 8

6. _____ pencils can be bought for Rs. 30, if cost of a dozen pencils is Rs. 30.
   (a) 12 (b) 6 (c) 24 (d) 36

7. If the perimeter of a square is 16 cm, then its area is
   (a) 64 cm^2 (b) 81 cm^2 (c) 121 cm^2 (d) none of these

8. Which of the followings has both horizontal as well as vertical line of symmetry:
   (a) S (b) A (c) U (d) H

9. Which is a solution of the equation x + 4 = 6
   (a) x = 2 (b) x = 3 (c) x = 4 (d) x = 6

10. Perimeter of an equilateral triangle, whose each side is 'x' unit is

   (a) 3x (b) 3 – x (c) $\dfrac{3}{x}$ (d) 3 + x

11. Write a digit in the blank space of number 92___389 so that the number formed is divisible by 11.

12. The fraction of an hour is 40 minutes is _____

13. The area of a rectangle is 40 cm^2. If its breadth is 4 cm, then its length is _____

14. The length of Ramesh's notebook is 9 cm 5 mm. Its length in cm is _____

15. Equation for the statement " 2 multiplies by p and then subtracted from 5 is 10" is _____

16. Subtract Rs. 18.25 from Rs. 20.75

17. Following table shows the number of bicycles manufactured in a factory during the year 1998 to 2002. In which year were the maximum number of bicycles manufactured ?

Years	No.of bicycles manufactured
1998	800
1999	600
2000	900
2001	1100
2002	1200

18. Find the area of a rectangle whose length and breadth are 12 cm and 4 cm respectively.

19. If 12, 14, 9 and x are in proportion then find the value of x.

20. If there are 50 mangoes in a box, write the total number of mangoes in terms of the number of boxes?

SECTION – B

21. The bar graph given alongside shows the amount of wheat purchased by government during the year 1998-2002. Read the bar graph and write down your observations. In which year was (a) the wheat production maximum? (b) the wheat production minimum?
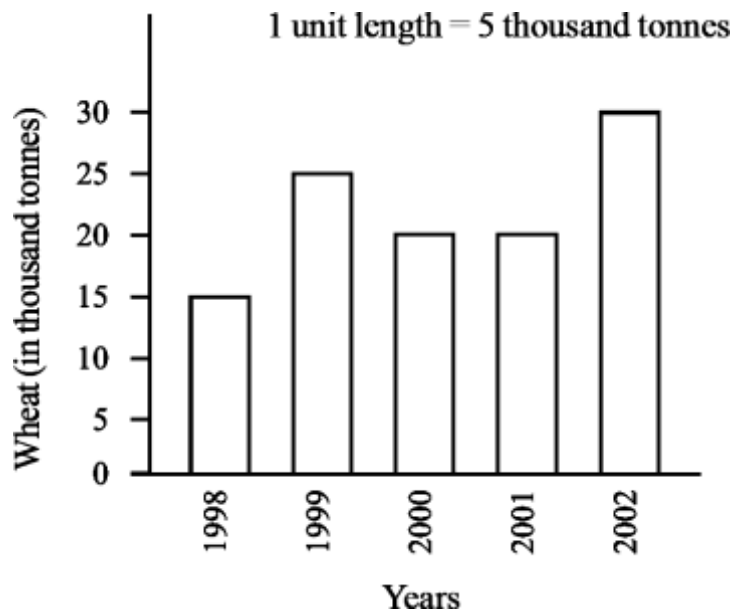
22. The length, breadth and height of a room are 825 cm, 675 cm and 450 cm respectively. Find the longest tape which can measure the three dimensions of the room exactly.

23. Cost of a dozen pens is Rs 180 and cost of 8 ball pens is Rs 56. Find the ratio of the cost of a pen to the cost of a ball pen.

24. A piece of wire $\frac{7}{8}$ metre long broke into two pieces. One piece was $\frac{1}{4}$ metre long. How long is the other piece?

25. On a squared paper, sketch the triangle with a horizontal line of symmetry but no vertical line of symmetry.

26. Draw a line segment of length 9.5 cm and construct its perpendicular bisector.

SECTION – C

27. Samson travelled 5 km 52 m by bus, 2 km 265 m by car and the rest 1km 30 m he walked. How much distance did he travel in all?

28. State the number of lines of symmetry for the following figures: (a) An equilateral triangle (b) An isosceles triangle (c) A square

29. Construct with ruler and compasses, angles of following measures: (a) 60° (b) 90°

30. Cost of 5 kg of wheat is Rs 30.50.
(a) What will be the cost of 8 kg of wheat?
(b) What quantity of wheat can be purchased in Rs 61?

31. Following is the pictograph of the number of Auto manufactured by a factory in a particular week.

Days	Number of Auto manufactured	= 300 Autos
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		

(a) On which day were the least number of Autos manufactured?
(b) On which day were the maximum numbers of Auto manufactured?
(c) Find out the approximate number of Auto manufactured in the particular week?

32. A bus travels at *v* km per hour. It is going from Daspur to Beespur. After the bus has travelled 5 hours, Beespur is still 20 km away. What is the distance from Daspur to Beespur? Express it using *v*.

33. A piece of string is 30 cm long. What will be the length of each side if the string is used to form :
(a) a square?   (b) an equilateral triangle?   (c) a regular hexagon?

34. Take Sarita's present age to be y years
(i) What will be her age 5 years from now?
(ii) What was her age 3 years back?
(iii) Sarita's grandfather is 6 times her age. What is the age of her grandfather?

SECTION – D

35. How many tiles whose length and breadth are 12 cm and 5 cm respectively will be needed to fit in a rectangular region whose length and breadth are respectively: (a) 100 cm and 144 cm (b) 70 cm and 36 cm.

36. Teacher asks one student to collect the data of the number of home appliances sold in any one shop. The student collected the data as given in below table. He submitted the data to the teacher and then teacher ask him to draw the bar graph to represent the collected information

Home appliances	Refrigerator	Television	Washing Machine	Cooler	DVD Player
Number of home appliances	75	45	30	60	30

37. Draw a circle with centre C and radius 3.4 cm. Draw any chord AB. Construct the perpendicular bisector of AB and examine if it passes through C.

38. Find the value of :
(a) 9.756 – 6.28
(b) 21.05 – 15.27
(c) 27.076 + 0.55 + 0.004
(d) 25.65 + 9.005 + 3.7

39. The teacher incharge collected the religion wise enrolment of the school by taking the data from each class teachers to submit the same to the Head Office. The number of Hindu students is 288, the number of Muslim students is 252, the number of Sikh students is 144 and the number of Christian students is 72. Find the ratio of (a) the number of Hindu students to the number of Christian students. (b) the number of Muslim students to the total number of students.

40. The Apartment association members decided in the meeting to fence the park situated in the middle of the six blocks. They paid Rs. 55000 for the total cost of fencing the park. Find the cost of fencing per metre.

SAMPLE PAPER 02 FOR SESSION ENDING EXAM (2019-20)

SUBJECT: MATHEMATICS   MAX. MARKS : 80

CLASS : VI   DURATION : 3 HRS

General Instruction:
(i) All the questions are compulsory.
(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.
(iv) Use of calculators is not permitted.

SECTION – A

1. If a number is divisible two co-prime numbers than it is divisible by their

    (a) Sum also   (b) Difference also   (c) Product also   (d) Quotient also

2. The equivalent fraction of $\frac{3}{5}$ with denominator 20 is

    (a) $\frac{12}{20}$ (b) $\frac{20}{12}$ (c) $\frac{10}{20}$ (d) $\frac{15}{20}$

3. $600 + 2 + \frac{8}{10}$ can be written in decimal form as

    (a) 6002.8   (b) 602.8   (c) 628   (d) none of these

4. Find the number of mangoes purchased for a home during February is
    (a) 20   (b) 25   (c) 30   (d) 15

Months	Number of Mangoes 🥭 = 5 Mangoes
JANUARY	🥭 🥭 🥭
FEBRUARY	🥭 🥭 🥭 🥭 🥭
MARCH	🥭 🥭 🥭 🥭
APRIL	🥭 🥭 🥭 🥭

5. Area of rectangular garden of 50 m broad is 300 sq. m, the length of garden is
    (a) 250 m   (b) 6m   (c) 6m²   (d) 60m

6. A teacher distribute 15 pencils per student, how many pencils are needed for 'y' students:

    (a) 15 – y   (b) 15 + y   (c) $\frac{15}{y}$ (d) 15y

7. The equation for the statement: one forth of a number minus 4 gives 4.

    (a) 4x – 4 = 4   (b) $\frac{4}{x} - 4 = 4$ (c) $\frac{1}{4}x - 4 = 4$ (d) $x - 4 = \frac{1}{4}$

8. Letter '**A**' of the English alphabet have reflectional symmetry (i.e., symmetry related to mirror reflection) about.
   (a) a vertical mirror   (b) a horizontal mirror   (c) both (a) and (b)   (d) none of these

9. If 10, x, 15 and 3 are in proportion then find the value of x.
   (a) 2   (b) 6   (c) 8   (d) none of these

10. The ratio of 90 cm to 1.5 m is...........
    (a) 3 : 5   (b) 5 : 3   (c) 60 : 1   (d) 4 : 3

11. The perimeter of regular octagon is 16 cm, the length of each side will be _____

12. The length of a young gram plant is 65 mm. Its length in cm is_____.

13. 108.56 can be written in words as _____

14. A bird flies 1 kilometer in one minute. The distance covered by the bird in terms of its flying time in minutes is expressed as _____

15. The ratio of 20 Km to 100 Km is _____

16. Meera went to a park 150 m long and 80 m wide. She took one complete round on its boundary. What is the distance covered by her?

17. Express 725 Paisa in rupees.

18. Write the smallest digit in the blank space of number 4765 2 so that the number formed is divisible by 3.

19. Reduce the fraction $\dfrac{48}{60}$ to simplest form.

20. The following are the number of electric bulbs purchased for a lodging house during the first four months of a year. (Each bulb symbol represent 10 bulbs.) Find the numbers of bulbs purchased during April.

SECTION – B

21. In a morning walk, three persons step off together. Their steps measure 80 cm, 85 cm and 90 cm respectively. What is the minimum distance each should walk so that all can cover the same distance in complete steps?

22. With PQ of length 6 cm as diameter, draw a circle.

23. Jaidev takes $2\frac{1}{5}$ minutes to walk across the school ground. Rahul takes $\frac{7}{4}$ minutes to do the same. Who takes less time and by what fraction?

24. Write the letters of the word 'MATHEMATICS' which have no line of symmetry.

25. There are 45 persons working in an office. If the number of females is 25 and the remaining are males, find the ratio of :
   (a) The number of females to number of males.
   (b) The number of males to number of females.

26. Following is the choice of sweets of 30 students of Class VI.
   Ladoo, Barfi, Ladoo, Jalebi, Ladoo, Rasgulla, Jalebi, Ladoo, Barfi, Rasgulla, Ladoo, Jalebi, Jalebi, Rasgulla, Ladoo, Rasgulla, Jalebi, Ladoo, Rasgulla, Ladoo, Ladoo, Barfi, Rasgulla, Rasgulla, Jalebi, Rasgulla, Ladoo, Rasgulla, Jalebi, Ladoo.
   (a) Arrange the names of sweets in a table using tally marks.
   (b) Which sweet is preferred by most of the students?

SECTION – C

27. Draw a circle of radius 4 cm. Draw any two of its chords. Construct the perpendicular bisectors of these chords. Where do they meet?

28. Subtract :
(a) Rs 5.36 from Rs 8.40   (b) 2.051 km from 5.206 km

29. Aakash bought vegetables weighing 10 kg. Out of this, 3 kg 500 g is onions, 2 kg 75 g is tomatoes and the rest is potatoes. What is the weight of the potatoes?

30. Present age of father is 42 years and that of his son is 14 years. Find the ratio of
   (a) Age of the father to the age of son, when son was 12 years old.
   (b) Age of father after 10 years to the age of son after 10 years.
   (c) Age of father to the age of son when father was 30 years old.

31. The following are the number of electric bulbs purchased for a lodging house during the first four months of a year.

Months	January	February	March	April
No. of bulbs	20	24	30	34

Represent the details by a pictograph.

32. Consider the letters of English alphabets, A to Z. List among them the letters which have
   (a) vertical lines of symmetry
   (b) horizontal lines of symmetry
   (c) no lines of symmetry

33. Sweety runs around a square park of side 75 m. Bulbul runs around a rectangular park with length 60 m and breadth 45 m. Who covers less distance?

34. Complete the table and by inspection of the table find the solution to the equation $m + 10 = 16$.

m	1	2	3	4	5	6
m + 10						

SECTION – D

35. Construct with ruler and compasses, angles of following measures: (a) 30° (b) 45°

36. Following table shows the number of bicycles manufactured in a factory during the years 1998 to 2002. Illustrate this data using a bar graph. Choose a scale of your choice.

Years	Number of bicycles manufactured
1998	800
1999	600
2000	900
2001	1100
2002	1200

(a) In which year were the maximum numbers of bicycles manufactured?
(b) In which year were the minimum numbers of bicycles manufactured?

37. Bob wants to cover the floor of a room 3 m wide and 4 m long by squared tiles. If each square tile is of side 0.5 m, then find the number of tiles required to cover the floor of the room.

38. Length and breadth of a bulletin board are r cm and t cm, respectively.
(i) What will be the length (in cm) of the aluminium strip required to frame the board, if 10cm extra strip is required to fix it properly.
(ii) If x nails are used to repair one board, how many nails will be required to repair 15 such boards?
(iii) If 500sqcm extra cloth per board is required to cover the edges, what will be the total area of the cloth required to cover 8 such boards?
(iv) What will be the expenditure for making 23 boards, if the carpenter charges Rs x per board.

39. Determine if the following ratios form a proportion. Also, write the middle terms and extreme terms where the ratios form a proportion.
(a) 25 cm : 1 m and Rs 40 : Rs 160   (b) 39 litres : 65 litres and 6 bottles : 10 bottles

40. What is the length of outer boundary of the park shown in the above right figure? What will be the total cost of fencing it at the rate of Rs 20 per metre? There is a rectangular flower bed in the center of the park. Find the cost of manuring the flower bed at the rate of Rs 50 per square metre.
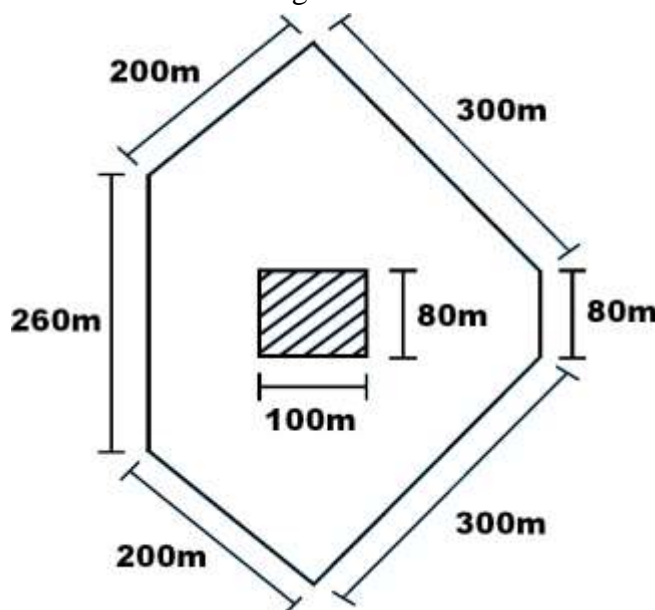
SAMPLE PAPER 03 FOR SESSION ENDING EXAM (2019-20)

SUBJECT: MATHEMATICS   MAX. MARKS : 80
CLASS : VI   DURATION : 3 HRS

General Instruction:
(i) All the questions are compulsory.
(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.
(iv) Use of calculators is not permitted.

SECTION – A

1. $20+9+\dfrac{4}{10}+\dfrac{1}{100}$ can be written in decimal as

(a) 29.04   (b) 29.40   (c) 2940   (d) 0.2940

2. Which of the following can be written in the box $\dfrac{2}{7}=\dfrac{8}{\boxed{\dots}}$

(a)16   (b)13   (c) 28   (d) 35

3. Common factors of 15 and 25 are
(a) 15   (b) 25   (c) 5   (d) 75

4. Following table shows the number of bicycles manufactured in a factory during the year 1998 to 2002. Read the table and answer the questions given below

Years	No.of bicycles manufactured
1998	800
1999	600
2000	900
2001	1100
2002	1200

What is the difference between number of bicycles manufactured in 2002 and 1999 ?
(a) 600   (b) 1200   (c) 500   (d) 1800

5. If perimeter of triangle is 15 cm and any two sides are of length 4 cm and 3 cm , then length of third side will be
(a) 7 cm   (b) 15 cm^2 (c) 15 cm^3 (d) 15 m

6. 36 : 84 is equivalent ratio of _____
(a) 7 : 3   (b) 3 : 7   (c) 6 : 7   (d) 12 : 7

7. Find the ratio of 25 to 125 ?
(a) 5 : 1   (b) 5 : 15   (c) 1 : 5   (d) 10 : 25

8. Letter '**D**' of the English alphabet have reflectional symmetry (i.e., symmetry related to mirror reflection) about.
(a) a vertical mirror   (b) a horizontal mirror   (c) both (a) and (b)   (d) none of these

9. Write the statements "*m* multiplied by –9" in the form of expression:
   (a) m – 9   (b) 9 – m   (c) –pm   (d) none of these

10. Which is a solution of the equation $7x + 5 = 19$
   (a) x = 2   (b) x = 3   (c) x = 4   (d) x = 6

11. The greatest prime number between 1 and 10 is _____

12. The fraction of a day is 8 hours is _____

13. The expressions for "5 times *y* to which 3 is added" is _____

14. A table top measures 3 m by 50 cm, the area in sq. m will be _____

15. The decimal form of $700 + 20 + 5 + \dfrac{9}{100}$ is _____

16. If there are 50 mangoes in a box, how will you write the total number of mangoes in terms of the number of boxes? (Use *x* for the number of boxes.)

17. Cadets are marching in a parade. There are 5 cadets in a row. What is the rule which gives the number of cadets, given the number of rows?

18. The following are the number of electric bulbs purchased for a lodging house during the first four months of a year. (Each bulb symbol represents 10 bulbs.) Find the total numbers of bulbs during the four months.

19. Find the ratio of 500 ml to 2 litres.

20. Express 2 m 45 cm as metres using decimals.

SECTION – B

21. Nandini's house is $\dfrac{9}{10}$ km from her school. She walked some distance and then took a bus for $\dfrac{1}{2}$ km to reach the school. How far did she walk?

22. Draw a line segment of length 9.5 cm and construct its perpendicular bisector.

23. Find the rule, which gives the number of matchsticks required to make matchstick pattern of letter E as E. Use a variable to write the rule.

24. Two tankers contain 850 litres and 680 litres of kerosene oil respectively. Find the maximum capacity of a container which can measure the kerosene oil of both the tankers when used an exact number of times.

25. Following is the pictograph of the number of Maruti Van manufactured by a factory in a particular week.

Days	Number of Maruti Van manufactured	= 200 Maruti Vans
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		

(a) On which day were the minimum numbers of Maruti Van manufactured?
(b) On which day were the maximum numbers of Maruti Van manufactured?

26. In each figure alongside, a letter of the alphabet is shown along with a vertical line. Take the mirror image of the letter in the given line. Find which letters look the same after reflection (i.e. which letters look the same in the image) and which do not.
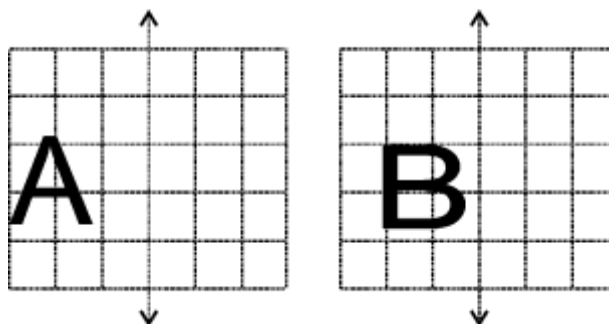
SECTION – C

27. Arun, Abhinav and Vaibhav bought 8.5 litres, 7.25 litres and 9.4 litres milk respectively from a milk booth. How much milk did they buy in all? If there was 40 litres of milk in booth, find the quantity of milk left.

28. Find the perimeter of each of the following shapes :
(a) A triangle of sides 3 cm, 4 cm and 5 cm.
(b) An equilateral triangle of side 9 cm.
(c) An isosceles triangle with equal sides 8 cm each and third side 6 cm.

29. On a squared paper, sketch the following:
(a) A quadrilateral with both horizontal and vertical lines of symmetry.
(b) A hexagon with exactly two lines of symmetry.

30. In a year, Seema earns Rs 1,50,000 and saves Rs 50,000. Find the ratio of
  (a) Money that Seema earns to the money she saves.
  (b) Money that she saves to the money she spends.

31. By splitting the following figures into rectangles, find their areas (The measures are given in centimetres).
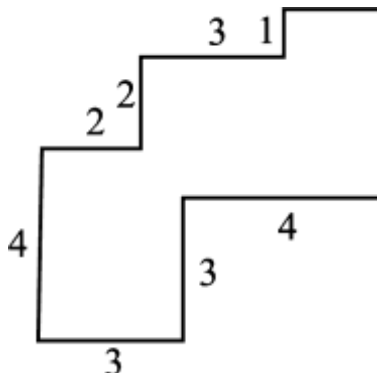
32. Complete the table and by inspection of the table find the solution to the equation $m - 7 = 3$.

m	7	8	9	10	11	12
m – 7						

33. A survey of 120 school students was done to find which activity they prefer to do in their free time.

Preferred activity	Number of students
Playing	45
Reading story books	30
Watching TV	20
Listening to music	10
Painting	15

Draw a pictograph to illustrate the above data taking scale of 5 students for 1 picture. Which activity is preferred by most of the students other than playing?

34. Construct with ruler and compasses, angles of following measures: (a) 120° (b) 90°

SECTION – D

35. Draw a rough figure and label suitably in each of the following cases:
  (a) Point P lies on $\overline{AB}$.   (b) *XY* and *PQ* intersect at M.

  (c) Line *l* contains E and F but not D.   (d) *OP* and *OQ* meet at O.

36. A car travels 180 km in $2\frac{1}{2}$ hours.
  (a) How much time is required to cover 60 km with the same speed?
  (b) Find the distance covered in 2 hours with the same speed.

37. In an exhibition hall, there are 24 display boards each of length 1m 50cm and breadth 1m. There is a 100m long aluminium strip, which is used to frame these boards. How many boards will be framed using this strip? Find also the length of the aluminium strip required for the remaining boards.

38. Namita travels 20 km 50 m every day. Out of this she travels 10 km 200 m by bus and the rest by auto. How much distance does she travel by auto? If she travels 9 km 400 m by auto then how much distance does she travel by bus?

39. Samira sells newspapers at Janpath crossing daily. On a particular day, she had 312 newspapers out of which 216 are in English and remaining in Hindi. Find the ratio of (a) the number of English newspapers to the number of Hindi newspapers. (b) the number of Hindi newspapers to the total number of newspapers.

40. Following table shows the monthly expenditure of Imran's family on various items.

Items	Expenditure (in Rs)
House rent	3000
Food	3400
Education	800
Electricity	400
Transport	600
Miscellaneous	1200

To represent this data in the form of a bar diagram, here are the steps.
(a) Draw two perpendicular lines, one vertical and one horizontal.
(b) Along the horizontal line, mark the 'items' and along the vertical line, mark the corresponding expenditure.

CLASS VII

SAMPLE PAPER 01 FOR SESSION ENDING EXAM (2019-20)

SUBJECT: MATHEMATICS   **MAX. MARKS : 80**
CLASS : VII   **DURATION : 3 HRS**

General Instruction:
(i) All the questions are compulsory.
(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.
(iv) Use of calculators is not permitted.

SECTION – A

1. The sum of the rational numbers $\dfrac{-5}{16}$ and $\dfrac{7}{12}$ is
   (a) $\dfrac{-7}{48}$ (b) $\dfrac{-11}{30}$ (c) $\dfrac{13}{48}$ (d) $\dfrac{1}{3}$

2. A survey of 40 children showed that 25% liked playing football. How many children not liked playing football?
   (a) 90   b) 60   c) 30   d) none of these

3. If $\Delta DEF \cong \Delta ACB$, then the part of ΔACB that correspond to $\angle F$ is
   (a) $\angle A$ *(b) $\angle B$*   *(c) $\angle C$*   (d) none of these

4. 16 x 10 + 2 is equal to
   (a) 162   (b) 192   (c) 52   (d) 320

5. The base in the area of parallelogram is
   (a) $\dfrac{area}{height}$ *(b) $\dfrac{height}{area}$*   (c) area x base   (d) area x height

6. The order of the rotational symmetry of the parallelogram about the centre is
   (a) 0   (b) 1   (c) 2   (d) 3

7. Simplify and write in exponential form of $5^2 \times 5^7 \times 5^{12}$
   (a) 5^3 (b) 5^7 (c) 5^{21} (d) none of these

8. ΔABC is isosceles in which $AE \perp BC$, $AE = 6$ cm , $BC = 9$ cm, the area of ΔABC is
   (a) 27 cm^2 (b) 54 cm^2 (c) 22.5 cm^2 (d) 45 cm^2

9. What are the coefficients of x in the expression $8 - x + y$?
   (a) 1   (b) –1   (c) 8   (d) none of these

10. Write an expression : Raju s father s age is 5 years more than 3 times Raju s age . If Raju s age is x years , then father's age is
    (a) 3x+5   (b) 5-3x   (c) 3x-5   (d) 15x

11. Write one more rational numbers in each of the following patterns: $\dfrac{-3}{5}, \dfrac{-6}{10}, \dfrac{-9}{15}, \dfrac{12}{20}, \ldots\ldots$

12. The number of lines of symmetry in a circle is _____

13. If the area of a circle is 49π cm^2, then its circumference is _____

14. There are 120 voters, 90 of them voted yes. The percent voted yes is _____

15. 729 expressed as a power of 3 is _____

16. Add: $x^2 - y^2 - 1$, $y^2 - 1 - x^2$

17. What number should be subtracted from $-\dfrac{3}{5}$ to get -2?

18. Express 512 using exponential notation.

19. What cross-sections do you get when you give a horizontal cut to the circular pipe?

20. Find the number of lines of symmetry of the given figure:
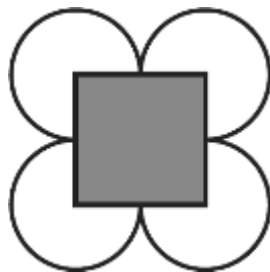
SECTION – B

21. An elevator descends into a mine shaft at the rate of 6 m/min. If the descent starts from 10 m above the ground level, how long will it take to reach – 350 m.

22. In the below figure, ray AZ bisects $\angle$ DAB as well as $\angle$ DCB.
(i) State the three pairs of equal parts in triangles BAC and DAC.
(ii) Is $\triangle BAC \cong \triangle DAC$? Give reasons.
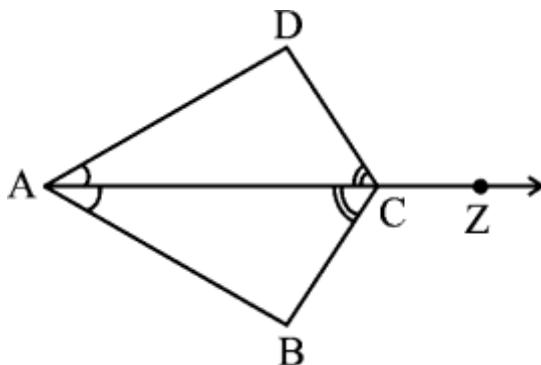
23. Draw a rough sketch of a quadrilateral with a rotational symmetry of order more than 1 but not line symmetry.

24. If two cubes of dimensions 2 cm by 2cm by 2cm are placed side by side, what would the dimensions of the resulting cuboid be?

25. Find the value of $\dfrac{3}{13} \div \left(\dfrac{-4}{65}\right)$

26. The circumference of a circle is 31.4 cm. Find the radius and the area of the circle?
(Take $\pi = 3.14$)

SECTION – C

27. Give the order of the rotational symmetry of the given figures about the point marked x.

(i)　　　　　(ii)　　　　　(iii)
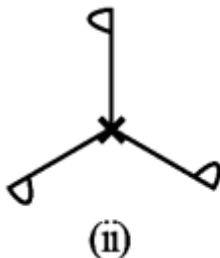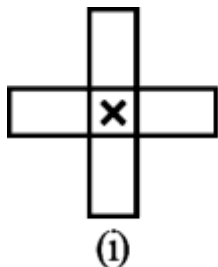
28. For given solid, draw the top view, front view and side view.
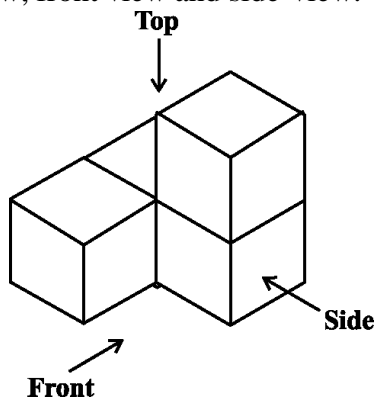
29. When a = 0, b = – 1, find the value of the given expressions: (i) $2a^2b + 2ab^2 + ab$ (i1) $a^2 + ab + 2$

30. Construct the right angled ΔPQR, where $m\angle$ Q = 90°, QR = 8cm and PR = 10 cm.

31. In the below figure, AB = AC and AD is the bisector of $\angle$ BAC.
(i) State three pairs of equal parts in triangles ADB and ADC.
(ii) Is ΔADB $\cong$ ΔADC? Give reasons.
(iii) Is $\angle$ B = $\angle$ C? Give reasons.
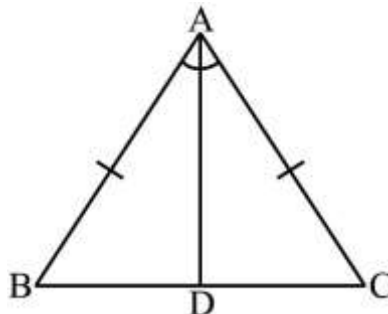
32. Simplify: $\dfrac{(2^5)^2 \times 7^3}{8^3 \times 7}$

33. Find any three rational numbers between $\dfrac{-5}{6}$ and $\dfrac{5}{8}$

34. PQRS is a parallelogram (see the below). QM is the height from Q to SR and QN is the height from Q to PS. If SR = 12 cm and QM = 7.6 cm. Find: (a) the area of the parallegram PQRS (b) QN, if PS = 8 cm
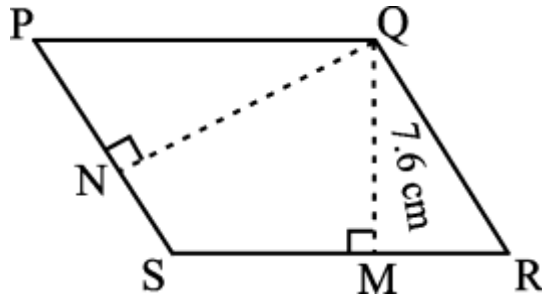
35. Ambika got 99 % marks in Mathematics, 76% marks in Hindi, 61 per cent in English, 84% in Science, and 95% in Social Science. If each subject carries 100 marks, then find the percentage of marks obtained by Ambika in the aggregate of all the subjects. If she would secured 75% in English and 80% in Hindi, then find the percentage of marks obtained by Ambika in the aggregate of all the subjects.

36. (a) From the sum of $3x - y + 11$ and $- y - 11$, subtract $3x - y - 11$.
(b) What should be taken away from $3x^2 - 4y^2 + 5xy + 20$ to obtain $- x^2 - y^2 + 6xy + 20$?

37. Represent these numbers on the number line. (i) $\frac{7}{4}$ (ii) $\frac{-5}{6}$ (iii) $\frac{4}{7}$ (iv) $\frac{-6}{9}$

38. Construct $\triangle ABC$, given m$\angle$ A = 60°, m$\angle$ B = 30° and AB = 5.8 cm.

39. A photograph of Billiard/Snooker table has dimensions as 1/10th of its actual size as shown in below figure:
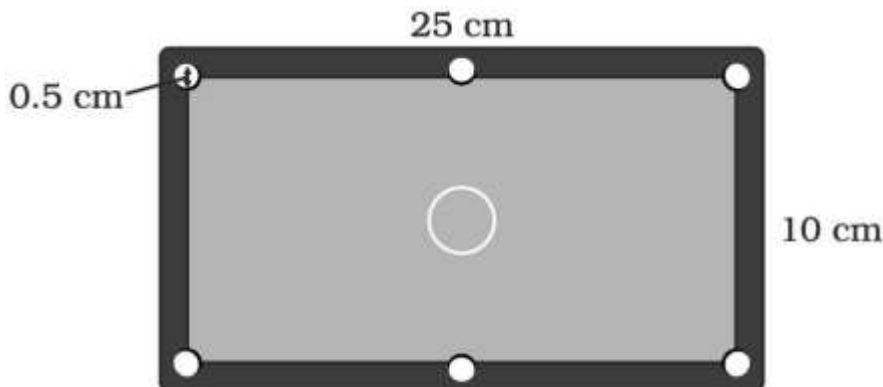
The portion excluding six holes each of diameter 0.5 cm needs to be polished at rate of Rs. 200 per m². Find the cost of polishing.

40. Express the number appearing in the following statements in standard form.
(a) The distance between Earth and Moon is 384,000,000 m.
(b) Speed of light in vacuum is 300,000,000 m/s.
(c) Diameter of the Earth is 1,27,56,000 m.
(d) Diameter of the Sun is 1,400,000,000 m.

SUBJECT: MATHEMATICS   **MAX. MARKS : 80**
CLASS : VII   **DURATION : 3 HRS**

General Instruction:
(i) All the questions are compulsory.
(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.
(iv) Use of calculators is not permitted.

SECTION – A

1. What number should be added to $\dfrac{7}{12}$ to get $\dfrac{4}{15}$?

   (a) $-\dfrac{19}{60}$ (b) $-\dfrac{11}{30}$ (c) $\dfrac{51}{60}$

2. 7 steps to the left of 4 on number line gives:
   (a) 3   (b) 11   (c) - 11   (d) - 3

3. The ratio of 90 cm to 1.5 m is
   (a) 2 : 5   b) 3 : 5   c) 4 : 5   d) none of these

4. On decreasing the radius of the circle by 30%, its area is decreased by
   (a) 30%   (b) 60%   (c) 45%   (d) none of these

5. The order of the rotational symmetry of the below left figure about the point marked 'x'
   (a) 0   (b) 1   (c) 2   (d) 3

6. The order of the rotational symmetry of the above sided right figure about the point marked 'x'
   (a) 0   (b) 1   (c) 2   (d) 3

7. In simplified   form ($3^0 + 4^0 + 5^0$)^0 is equals to
   (a) 12   (b) 3   (c) 12   (d) 1

8. The area of the square is the same as the area of the circle. Their perimeter are in the ratio
   (a) 1 : 1   (b) π : 2   (c) 2 : π (d) none of these

9. The expression xyz is
   (a) Monomial   (b) Binomial   (c) Trinomial   (d) Zero polynomial

10. From the following expressions 10pq, 7p, 8q, $-p^2q^2$, -7pq, -23, ab,3a,b.The like terms are
    (a) 3,7p   (b) 10 pq, –7pq   (c) ab,3a,b   (d)10pq,7p,8q

11. 5 added to the – 1 gives _____

12. In a computer lab, there are 3 computers for every 6 students. The computers will be needed for 24 students is _____

13. 648 expressed as a product of powers of prime factors is _____

14. Find the area of a circle of radius 30 cm (use $\pi = 3.14$) is _____

15. Letter '**M**' of the English alphabet have reflectional symmetry (i.e., symmetry related to mirror reflection) about is _____

16. Express 729 as a power 3.

17. If $p = -2$, find the value of $-3p^2 + 4p + 7$

18. What is the circumference of a circle of diameter 10 cm (Take $\pi = 3.14$)?

19. What cross-sections do you get when you give a vertical cut to the brick?

20. Find the number of lines of symmetry of the given figure:
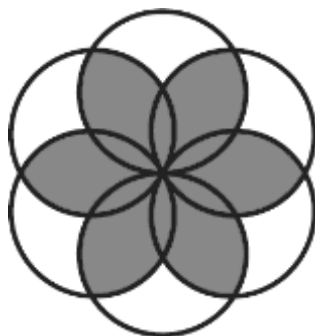
SECTION – B

21. Using laws of exponents, simplify and write the answer in exponential form: $(2^{20} \div 2^{15}) \times 2^3$

22. The temperature at 12 noon was 10°C above zero. If it decreases at the rate of 2°C per hour until midnight, at what time would the temperature be 8°C below zero? What would be the temperature at mid-night?

23. In the below figure, it is given that LM = ON and NL = MO
    (a) State the three pairs of equal parts in the triangles NOM and MLN.
    (b) Is $\triangle NOM \cong \triangle MLN$. Give reason?
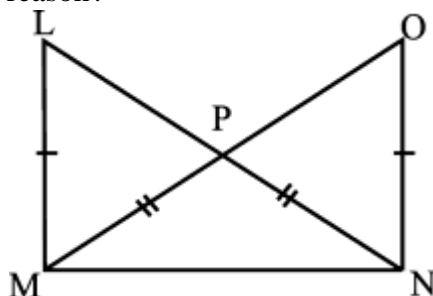
24. The number of illiterate persons in a country decreased from 150 lakhs to 100 lakhs in 10 years. What is the percentage of decrease?

Find the value of $\dfrac{-7}{12} \div \left(\dfrac{-2}{13}\right)$

25. Two dice are placed side by side as shown in below figure. What the total would be on the face opposite to (a) 5 + 6 (b) 4 + 3
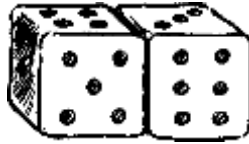
26. In the below Fig, BD and CE are altitudes of $\triangle ABC$ such that BD = CE.
   (i) State the three pairs of equal parts in $\triangle CBD$ and $\triangle BCE$.
   (ii) Is $\triangle CBD \cong \triangle BCE$? Why or why not?
   (iii) Is $\angle DCB = \angle EBC$? Why or why not?
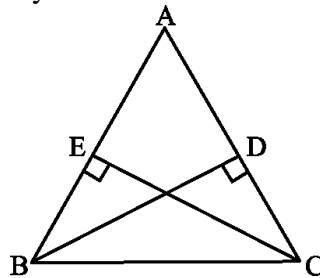
27. Find any three rational numbers between $\dfrac{1}{4}$ and $\dfrac{1}{2}$.

28. Draw, wherever possible, a rough sketch of
   (i) a triangle with both line and rotational symmetries of order more than 1.
   (ii) a triangle with only line symmetry and no rotational symmetry of order more than 1.

29. Add:
   (i) $14x + 10y - 12xy - 13$, $18 - 7x - 10y + 8xy$, $4xy$
   (ii) $3p^2q^2 - 4pq + 5$, $-10 p^2q^2$, $15 + 9pq + 7p^2q^2$

30. In an examination, there are three papers each of 100 marks. A candidate obtained 53 marks in the first and 75 marks in the second paper. How many marks must the candidate obtain in the third paper to get an overall of 70 per cent marks?

31. Construct $\triangle LMN$, right-angled at M, given that LN = 5 cm and MN = 3 cm.

32. A verandah of width 2.25 m is constructed all along outside a room which is 5.5 m long and 4 m wide. Find: (i) the area of the verandah.
   (ii) the cost of cementing the floor of the verandah at the rate of Rs 200 per m².

33. A square tile of length 20 cm has four quarter circles at each corner as shown in below Fig. (i). Find the area of shaded portion. Another tile with same dimensions has a circle in the centre of the tile [see below Fig. (ii)]. If the circle touches all the four sides of the square tile, find the area of the shaded portion. In which tile, area of shaded portion will be more? (Take = 3.14)

A   B

(i)   (ii)
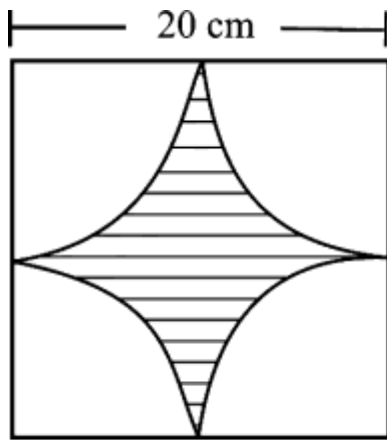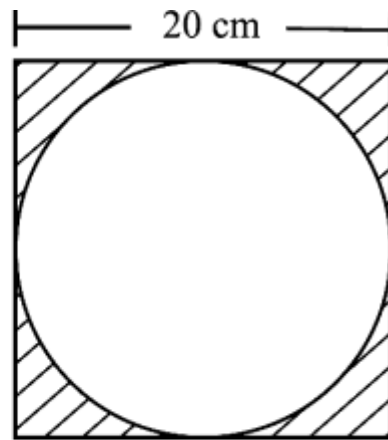
34. Find: $(i)\dfrac{-8}{19}+\dfrac{(-2)}{57}$ $(ii)\dfrac{-6}{13}-\dfrac{-7}{15}$

35. A light year is the distance that light can travel in one year.

  1 light year = 9,460,000,000,000 km.

(a) Express one light year in scientific notation.

(b) The average distance between Earth and Sun is 1.496×108 km. Express the distance in normal form.

(c) Is the distance between Earth and the Sun greater than, less than or equal to one light year?

(d) Find the difference between the distance between Earth & the Sun and one light year.

36. Complete the following table:

Shape	Centre of Rotation	Order of Rotation	Angle of Rotation
Rectangle			
Rhombus			
Equilateral Triangle			
Semi-circle			

37. From the sum of $2y^2 + 3yz$, $-y^2 - yz - z^2$ and $yz + 2z^2$, subtract the sum of $3y^2 - z^2$ and $-y^2 + yz + z^2$.

38. Three cubes each with 2 cm edge are placed side by side to form a cuboid. Make an oblique sketch and find its length, breadth and height.

39. Construct $\triangle PQR$ if $PQ = 5$ cm, $m\angle PQR = 105°$ and $m \angle QRP = 40°$.

SAMPLE PAPER 03 FOR SESSION ENDING EXAM (2019-20)

SUBJECT: MATHEMATICS   MAX. MARKS : 80
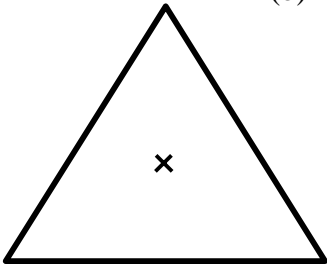
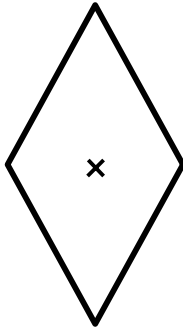**CLASS : VII**   DURATION : 3 HRS

General Instruction:

(i) All the questions are compulsory.

(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.

(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.

(iv) Use of calculators is not permitted.

SECTION – A

1. Find x such that $\dfrac{3}{5} = \dfrac{x}{-25}$

   (a) –5   (b) –15   (c) –15   (d) none of these

2. Which of the following statement is true:

   (a) 2 subtracted from – 3 gives 1   (b) – 1 subtracted from – 5 gives 6

   (c) 3 subtracted from – 8 gives – 11   (d) 1 subtracted from – 7 gives – 6

3. 8% children of a class of 25 like getting wet in the rain. How many children do not like getting wet in the rain.

   (a) 20   b) 22   c) 23   d) none of these

4. Which of the followings has no line of symmetry:

   (a) S   (b) A   (c) U   (d) H

5. What will be the area of circular button of radius 7 cm

   (a) 154 cm^2 (b) 49 cm^2 (c) 154 cm   (d) 3.14 x 7 cm^2

6. The area of parallelogram whose base 6 cm & altitude 7 cm is

   (a) 18 cm^2 (b) 18 cm   (c) 9 cm^2 (d) 9 cm

7. The sum of mn + 5 – 2 and mn+3 is

   (a) 2mn + 3   (b) 6   (c) 2mn + 8   (d) 2mn + 6.

8. On simplifying (a + b – 3) – (b – a +3) + (a – b + 3) the result is

   (a) a – b + 3   (b) a – b – 3   (c) 3a – b – 3   (d) 3a+b+3

9. Simplify and write in exponential form of $2^2 \times 2^5$

   (a) 2^3 (b) 2^7 (c) 128   (d) none of these

10. Simplify and write in exponential form of $(-4)^{100} \times (-4)^{20}$

    (a) $(-4)^{120}$ (b) $(-4)^{80}$ (c) $(-4)^{2000}$ (d) none of these

11. The letter look the same after reflection when the mirror is placed vertically is _____

12. The price of a scooter was Rs 34,000 last year. It has increased by 20% this year. The price now is _____

13. Diameter of a circular garden is 9.8 m. Its area is _____

14. Sum of – 36 and 29 is _____

15. 3125 is expressed using exponential notation is _____

16. The population of a city decreased from 25,000 to 24,500. Find the percentage decrease.

17. Find the value of the expression $n^3 + 5n^2 + 5n – 2$ when $n = – 2$.

18. What is the circumference of a circular disc of radius 14 cm?

19. Two dice are placed side by side with 5 + 2, what is the total on the face opposite to the given numbers.

20. Express 540 as a product of powers of prime factors

SECTION – B

21. In the below figure, DA ⊥ AB, CB ⊥ AB and AC = BD. State the three pairs of equal parts in ΔABC and ΔDAB. Which of the following statements is meaningful?
(i) ΔABC ≅ ΔBAD (ii) ΔABC ≅ ΔABD
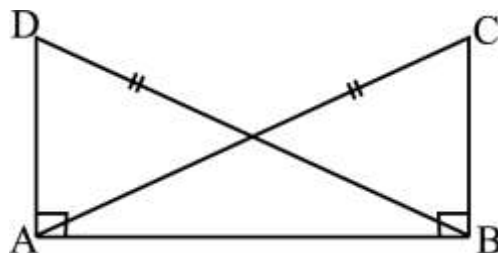
22. A green grocer had a profit of Rs. 47 on Monday, a loss of Rs. 12 on Tuesday and loss of Rs. 8 on Wednesday. Find his net profit or loss in 3 days.

23. State the number of lines of symmetry for the following figures:
(a) A square (b) A rectangle

24. Expand by expressing powers of 10 in the exponential form: (i) 172 (ii) 5,643

25. What cross-sections do you get when you give a (i) vertical cut (ii) horizontal cut to the following solids? (a) A die (d) A circular pipe

26. Find the value of $\dfrac{7}{24} - \dfrac{17}{36}$.

SECTION – C

27. Anil deposited Rs. 20,000 for saving as a fixed deposit in a bank at 10% per annum. Find the amount he will get after 5 years.

28. The dimensions of a cuboid are 5 cm, 3 cm and 2 cm. Draw three different isometric sketches of this cuboid.

29. In a park of dimensions 20 m × 15 m, there is a L shaped 1m wide flower bed as shown in below figure. Find the total cost of manuring for the flower bed at the rate of Rs 45 per m².
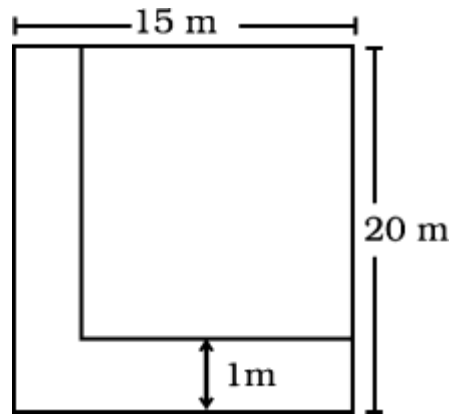
30. Simplify: $\dfrac{3^5 \times 10^5 \times 25}{5^7 \times 6^5}$

Find the value of (i) $\dfrac{-7}{12} \div \left(\dfrac{-2}{13}\right)$ (ii) $\dfrac{-1}{8} \div \dfrac{3}{4}$ (iii) $\dfrac{9}{2} \times \left(\dfrac{-7}{4}\right)$

31. Find the value of the following expressions when n = – 2.
(i) 5n – 2 (ii) $5n^2 + 5n - 2$ (iii) $n^3 + 5n^2 + 5n - 2$

32. Construct a triangle PQR, given that PQ = 3 cm, QR = 5.5 cm and ∠ PQR =60°.

33. Draw a line, say AB, take a point C outside it. Through C, draw a line parallel to AB using ruler and compasses only.

SECTION – D

34. A school playground is divided by a 2 m wide path which is parallel to the width of the playground, and a 3 m wide path which is parallel to the length of the ground (see below figure). If the length and width of the playground are 120 m and 80 m respectively, find the area of the remaining playground.
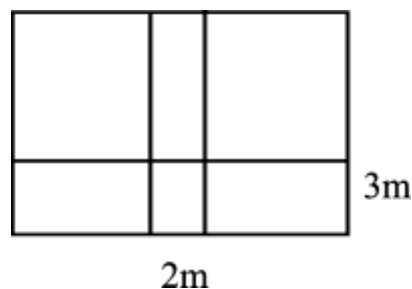
35. In each of the following figures, write the number of lines of symmetry and order of rotational symmetry.

36. Four friends had a competition to see how far could they hop on one foot. The table given shows the distance covered by each.

Name	Distance covered (km)
Seema	$\dfrac{1}{20}$
Nancy	$\dfrac{1}{40}$
Megha	$\dfrac{1}{32}$
Soni	$\dfrac{1}{25}$

(a) How farther did Soni hop than Nancy?
(b) What is the total distance covered by Seema and Megha?
(c) Who walked farther, Nancy or Megha?

37. In the adjoining figure, AD = CD and AB = CB.
(i) State the three pairs of equal parts in ΔABD and ΔCBD.
(ii) Is ΔABD ≅ ΔCBD? Why or why not?
(iii) Does BD bisect ∠ ABC? Give reasons.
(iv) Does BD bisect ∠ ADC? Give reasons.
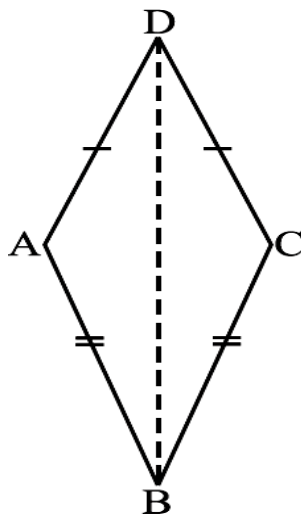
38. Construct ΔABC such that AB = 2.5 cm, BC = 6 cm and AC = 6.5 cm. Measure ∠ B.

39. (a) What should be taken away from $3x^2 - 4y^2 + 5xy + 20$ to obtain $-x^2 - y^2 + 6xy + 20$?
(b) From the sum of $3x - y + 11$ and $-y - 11$, subtract $3x - y - 11$.

CLASS

VIII

SAMPLE PAPER 02 FOR SESSION ENDING EXAM (2019-20)

SUBJECT: MATHEMATICS MAX. MARKS : 80
CLASS : VIII DURATION : 3 HRS

General Instruction:
(i) All the questions are compulsory.
(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.
(iv) Use of calculators is not permitted.

SECTION – A

1. The solution of $2x - 3 = 7$ is
   (a) 2 (b) –2 (c) 5 (d) –5

2. What is the smallest square number which is divisible by each of the numbers 6, 9 and 15 ?
   (a) 900 (b) 810 (c) 630 (d) 720

3. What should be value of 'a' if $y^2 + y - a$ equals to 3 for y=1
   (a) –1 (b) –5 (c) 5 (d) 0

4. The value of expression $2a^2 + 2b^2 - ab$ for a=2, b=1 is
   (a) 2 (b) 8 (c) 6 (d) 10

5. The perimeter of the below figure is
   (a) 11.6 cm (b) 14.6 cm (c) 12.8 cm (d) none of these
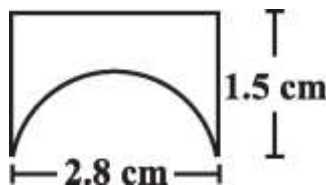
6. If the cost of 1 kg of sugar is Rs 18, then what would be the cost of 3 kg sugar?
   (a) Rs. 54 (b) Rs. 6 (c) Rs. 18 (d) none of these

7. The value of $(-1)^{500}$ is
   (a) –1 (b) 1 (c) 0 (d) none of these

8. The value of $\left(\dfrac{-1}{2}\right)^{-6}$ is
   (a) –64 (b) $\dfrac{-1}{64}$ (c) $\dfrac{1}{64}$ (d) 64

9. The factors of $2x^2 - 7x + 3$ are:
   (a) $(x - 3)(2x - 1)$ (b) $(x + 3)(2x + 1)$
   (c) $(x - 3)(2x + 1)$ (d) $(x + 3)(2x - 1)$

10. If y – coordinate of a point is zero, then this point always lies:
    (a) I quadrant   (b) II quadrant   (c) x – axis   (d) y – axis

11. A worker is paid Rs. 200 for 8 days work. If he works for 20 days, he get _____

12. The solution of $5t - 3 = 3t - 5$ is _____

13. The vertical cut of a brick will show the cross section is _____

14. The value of $\left(6^{-1} - 8^{-1}\right)^{-1}$ is _____

15. The lateral surface area of the cuboids whose dimensions are Length $= 22$cm, breadth $= 12$ cm and height $= 7.5$ cm is _____

16. Find the value of $\left(\dfrac{1}{2}\right)^{-2} + \left(\dfrac{1}{3}\right)^{-2} + \left(\dfrac{1}{4}\right)^{-2}$

17. The consumption of petrol is in in direct proportion with the corresponding distance travelled, find the value of x

        Petrol in litres (x) :   4   8
        Distance in km (y) :   60   x

18. If three angles of a quadrilateral are each equal to 75°, then find the fourth angle.

19. Find the value of $\dfrac{\sqrt{288}}{\sqrt{128}}$.

20. Find the product : $a^2(2ab - 5c)$

SECTION – B

21. Draw the top view and side view of the given solid:
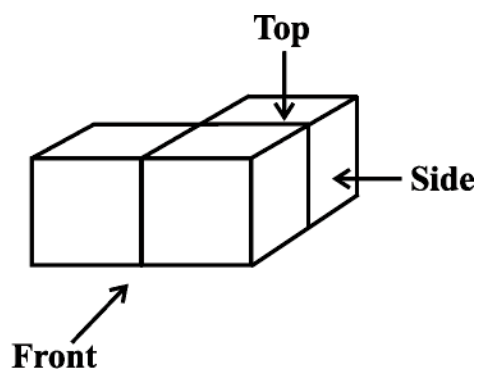
22. Find *m* so that $(-3)^{m+1} \times (-3)^5 = (-3)^7$

23. An electric pole, 14 metres high, casts a shadow of 10 metres. Find the height of a tree that casts a shadow of 15 metres under similar conditions.

24. Factorise (i) $6xy - 4y + 6 - 9x$ (ii) $x^2 + x\,y + 8x + 8y$

25. Simplify: $(x^2 - 5)(x + 5) + 25$

26. The ratio of exterior angle to interior angle of a regular polygon is 1 : 4. Find the number of sides of the polygon.

SECTION – C

27. Find x in the following figure.
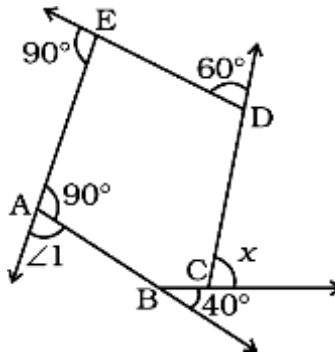
28. A volleyball court is in a rectangular shape and its dimensions are directly proportional to the dimensions of the swimming pool given below. Find the width of the pool.
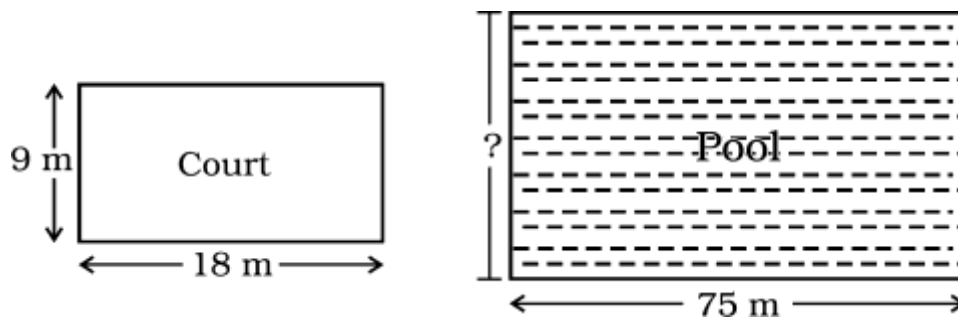
29. Factorise: (i) $4p^2 - 9q^2$ (ii) $a^4 + 2a^2b^2 + b^4$.

30. The shape of a garden is rectangular in the middle and semi circular at the ends as shown in the diagram. Find the area and the perimeter of this garden
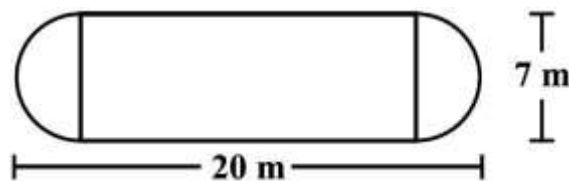
31. Numbers 1 to 20 are written on ten separate slips (one number on one slip), kept in a box and mixed well. One slip is chosen from the box without looking into it. What is the probability of
(i) getting a number less than 6?
(ii) getting a number greater than 6?
(iii) getting a 1-digit number?

32. Under Clean and Green school project, a school planted 6200 plants in the school. School wanted to plant in such a way that each row contains as many plants as the number of rows.
On checking they found that the number of rows and the number of plants are not equal. What is the least number that should be added to 6200 to make it a perfect square? Find the number of rows and the number of plants in each row.
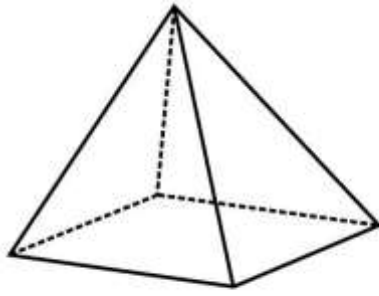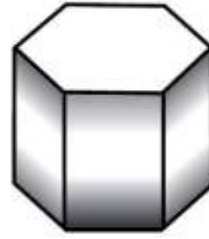
(i)   (ii)

34. Find the values of the letters in the following:

$$4\ A$$
$$+\ 9\ 8$$
$$\overline{C\ B\ 3}$$

SECTION – D

35. Lakshmi is a cashier in a bank. She has notes of denominations of Rs.100, 50 and 10 respectively. The ratio of number of these notes is 2:3:5 respectively. The total cash with Lakshmi is 4,00,000. How many notes of each denomination does she have?

36. Draw a pie chart of the data given below. The time spent by a child during a day.

Sleep   – 8 hours
School   – 6 hours
Home work – 4 hours
Play   – 4 hours
Others   – 2 hours

37. Use suitable Identity to find the following:
(i) 501×502 (ii) 99^2

38. Find the area of the following fields. All dimensions are in
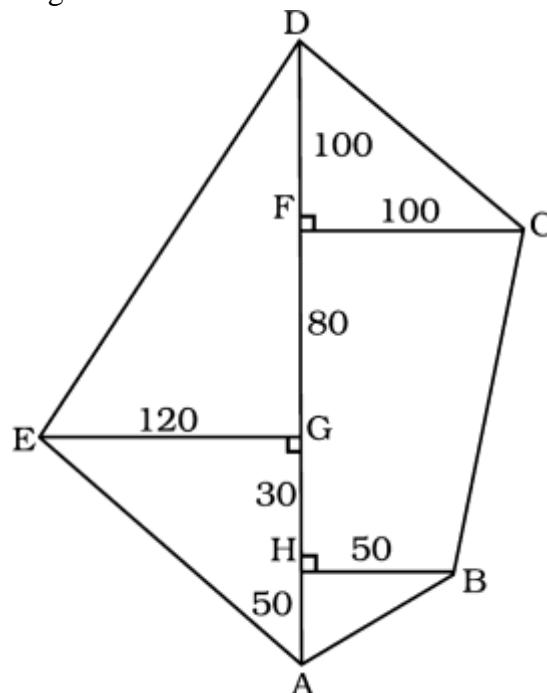
No. of Litres of petrol	10	15	20	25
Cost of petrol in Rs	500	750	1000	1250

Plot a graph to show the data.

40. (a) Divide $z(5z^2 - 80)$ by $5z(z + 4)$

(b) Factorise the expressions and divide as directed: $(y^2 + 7y + 10) \div (y + 5)$

■■

SUBJECT: MATHEMATICS   **MAX. MARKS : 80**
CLASS : VIII   **DURATION : 3 HRS**

General Instruction:
(i) All the questions are compulsory.
(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.
(iv) Use of calculators is not permitted.

SECTION – A

1. The point whose ordinate is 4 and which lies on y – axis is:
   (a) (4, 0) (b) (0, 4) (c) (1, 4) (d) (4, 2)

2. The perpendicular distance of the point P(3,4) from the y – axis is:
   (a) 3 (b) 4 (c) 5 (d) 7

3. Factors of $xy - pq + qy - px$ is
   (a) $(p - y)(x + q)$ (b) $(y - p)(x + q)$ (c) $(y + p)(x + q)$ (d) none of these

4. If $ab = 6$ and $a + b = 5$ then the value of $(a^2 + b^2)$ is
   (a) 11 (b) 12 (c) 13 (d) 16

5. If $\left(x + \dfrac{1}{x}\right) = 4$, then the value of $\left(x^2 + \dfrac{1}{x^2}\right)$ is
   (a) 14 (b) 12 (c) 16 (d) none of these

6. What is the length of the side of a square whose area is 441 cm^2 ?
   (a) 21 (b) 22 (c) 20 (d) 12

7. The circumference of two circles are in the ratio 2 : 3. The ratio of their areas is
   (a) 2 : 3 (b) 4 : 9 (c) 9 : 4 (d) none of these

8. Two numbers are in the ratio 5:3. If they differ by 18, what are the numbers?
   (a) 45, 27 (b) 50, 32 (c) 40, 22 (d) none of these

9. Express 2048 as a power 2.
   (a) 2^{16} (b) 2^8 (c) 4^8 (d) none of these

10. A car travels 432 km on 48 litres. How far would it travel on 20 litres of petrol?
    (a) 160 km (b) 180 km (c) 200 km (d) none of these

11. The solution of $3x = 2x + 18$ is _____

12. The number of faces if there are 6 vertices and 12 edges is _____

13. The area of a rhombus is 360 cm^2 and one of the diagonals is 18 cm then the length of other diagonal is _____

14. The height of the object is in direct proportion with the length of the shadow then the value of x is _____

height of the object (in metres) :	14	x
length of the shadow (in metres) :	10	
	15	

15. Factors of $x^2 + 10x + 25$ are _____

16. Find the side of a cube whose surface area is 600 cm^2.

17. Find the square of the number 3.5.

18. What is the sum of all the angles of a pentagon?

19. Simplify and write the answer in the exponential form: $(2^5 \div 2^8)^5 \times 2^{-5}$

20. Find the value of the expression $3x(4x - 5) + 3$ for $x = 3$

SECTION – B

21. If the weight of 12 sheets of thick paper is 40 grams, how many sheets of the same paper would weigh $2\frac{1}{2}$ kilograms?

22. Using identities, evaluate 297×303

23. Factorise : $a^2 - 2ab + b^2 - c^2$

24. Using Euler's formula find the unknown.

Faces	6	5
Vertices	8	5
Edges	?	?

25. Find the value of m for which $5^m \div 5^{-3} = 125$.

26. If two adjacent angles of a parallelogram are $(5x - 5)°$ and $(10x + 35)°$, then find the ratio of these angles.

SECTION – C

27. The weekly wages (in Rs) of 30 workers in a factory are.
830, 835, 890, 810, 835, 836, 869, 845, 898, 890, 820, 860, 832, 833, 855, 845,
804, 808, 812, 840, 885, 835, 835, 836, 878, 840, 868, 890, 806, 840
Using tally marks make a frequency table with intervals as 800–810, 810–820 and so on.

28. Rahul walks 12m north from his house and turns west to walk 35m to reach his friend's house. While returning, he walks diagonally from his friend's house to reach back to his house. What distance did he walk while returning?

29. ABCD is a parallelogram. Find the value of x, y and z.
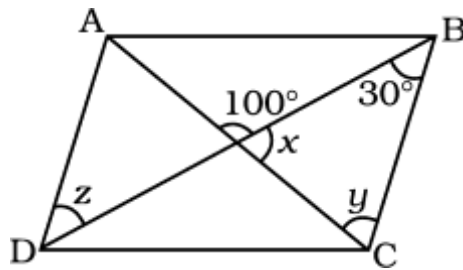
30. Simplify: $\dfrac{3^{-5} \times 10^{-5} \times 125}{5^{-7} \times 6^{-5}}$

31. Find the values of the letters in the given below:

$$\begin{array}{r} 3\,A \\ +\,2\,5 \\ \hline B\,2 \end{array}$$

32. Parveen wanted to make a temporary shelter for her car, by making a box-like structure with tarpaulin that covers all the four sides and the top of the car (with the front face as a flap which can be rolled up). Assuming that the stitching margins are very small, and therefore negligible, how much tarpaulin would be required to make the shelter of height 2.5 m, with base dimensions 4 m × 3 m?

33. Verify Euler's formula for these solids:
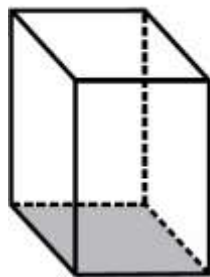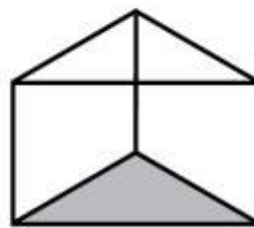
(i)   (ii)

34. Simplify: (i) $(t + s^2)\,(t^2 - s)$
(ii) $(a + b)\,(c - d) + (a - b)\,(c + d) + 2\,(ac + bd)$

<u>SECTION – D</u>

35. Kusum buys some chocolates at the rate of Rs. 10 per chocolate. She also buys an equal number of candies at the rate of Rs. 5 per candy. She makes a 20% profit on chocolates and 8% profit on candies. At the end of the day, all chocolates and candies are sold out and her profit is Rs. 240. Find the number of chocolates purchased.

36. Draw a graph for the following.

Side of square (in cm)	2	3	3.5	5	6
Perimeter (in cm)	8	12	14	20	24

Is it a linear graph?

37. (a) Factorise the expressions and divide them as directed: $(m^2 - 14m - 32) \div (m + 2)$

(b) Factorise: $a^4 - 2a^2b^2 + b^4$

38. A birthday cake has two tiers as shown in the figure below. Find the volume of the cake.
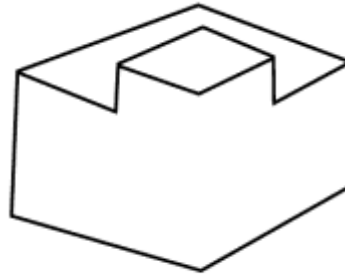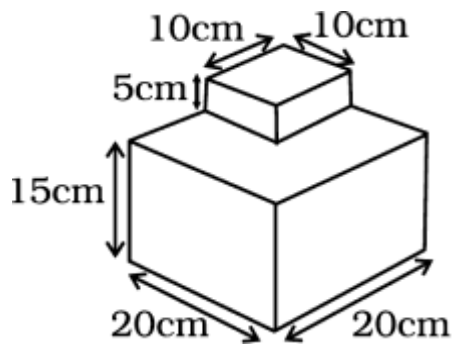
39. Kritika is following this recipe for bread. She realises her sister used most of sugar syrup for her breakfast. Kritika has only $\dfrac{1}{6}$ cup of syrup, so she decides to make a small size of bread. How

much of each ingredient shall she use?

Bread recipe

1 cup quick cooking oats

2 cups bread flour

$\frac{1}{3}$ cup sugar syrup

1 tablespoon cooking oil

$1\frac{1}{3}$ cups water

3 tablespoons yeast

1 teaspoon salt.

40. Teacher asks students to collect the data which represents the approximate percentage of water in various oceans. The students collected the following data given below. Prepare a pie chart for the given data.

Pacific	40%
Atlantic	30%
Indian	20%
Others	10%

■■■

SUBJECT: MATHEMATICS   MAX. MARKS : 80
CLASS : VIII   DURATION : 3 HRS

General Instruction:
(i) All the questions are compulsory.
(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.
(iv) Use of calculators is not permitted.

SECTION – A

1. Solve: 5x – 7 = 2x + 8
   (a) 5   (b) –9   (c) 5   (d) 9

2. The square root of 12.25 is _____.
   (a) 3.5   (b) 2.5   (c) 35   (d) 25

3. The value of $3x(4x – 5) + 3$ for x=3
   (a) –6   (b) 66   (c) 106   (d) 0

4. If $\left(x + \dfrac{1}{x} \right) = 4$, then the value of $\left(x^2 + \dfrac{1}{x^2} \right)$ is

   (a) 14   (b) 12   (c) 16   (d) none of these

5. A cuboidal vessel is 10 m long and 8 m wide. How high must it be made to hold 380 cubic metres of a liquid?
   (a) 4.75 m   (b) 7.85 m   (c) 4.75 cm   (d) none of these

6. In standard form 52,00,00,000 is equal to _____ .
   (a) 5.2×10^7 (b) 5.2×10^8 (c) 52×10^8 (d) 52 x 100,00,000

7. Point (0, –2) lies:
   (a) on the x-axis   (b) in the II quadrant   (c) on the y-axis   (d) in the IV quadrant

8. Factors of $x^2 – 7x + 12$ is
   (a) (x + 3)(x + 4)   (b) (x + 3)(x – 4)   (c) (x – 3)(x – 4)   (d) none of these

9. Abscissa of the all the points on x – axis is:
   (a) 0   (b) 1   (c) –1   (d) any number

10. If 15 oranges cost Rs. 70, what do 39 oranges cost?
   (a) Rs. 180   (b) Rs. 182   (c) Rs. 190   (d) none of these

11. The solution of 8x = 20 + 3x is _____

12. The exponential form for $8 \times 8 \times 8 \times 8$ taking base as 2 is _____

13. The diagonals of a rhombus are 7.5 cm and 12 cm. Its area is _____

14. If the number of pipes is in inverse proportion with the time, then the value of x is _____

$$\begin{array}{lcc} \text{Number of pipes :} & 6 & 5 \\ \text{Time (in minutes) :} & 80 & x \end{array}$$

15. Using Euler's formula if F = 5 and E = 14, then the value of V is _____

16. Evaluate: $(b - 7)^2$

17. The angles of a quadrilateral are in the ratio 1 : 2 : 3 : 4. Find the smallest angle

18. Find the square of the number 4.5.

19. If $3x - 4(64 - x) = 10$, then find the value of x.

20. Draw the top view of the given solid:
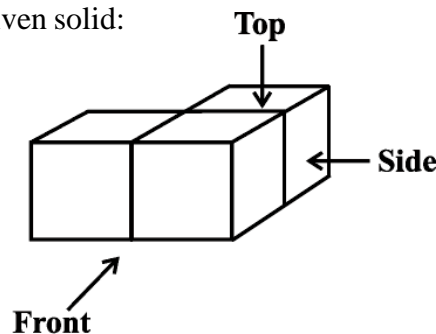
SECTION – B

21. A playground is in the form of a rectangle ATEF. Two players are standing at the points F and B where EF = EB. Find the values of x and y.
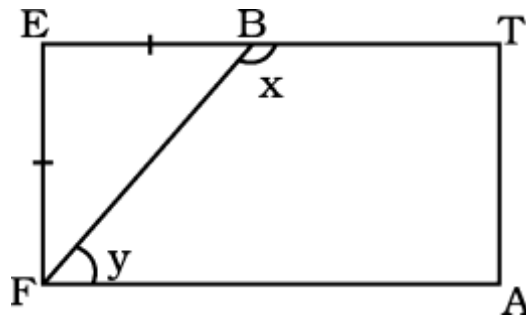
22. A gardener has 1000 plants. He wants to plant these in such a way that the number of rows and the number of columns remain same. Find the minimum number of plants he needs more for this.

23. 6 pipes are required to fill a tank in 1 hour 20 minutes. How long will it take if only 5 pipes of the same type are used?

24. Using Euler's formula find the unknown.

Faces	?	20
Vertices	6	12
Edges	12	?

25. Show that: $\left(\dfrac{4}{3}m - \dfrac{3}{4}n\right)^2 + 2mn = \dfrac{16}{9}m^2 + \dfrac{9}{16}n^2$

26. Find m so that $(-2)^{m+1} \times (-2)^3 = (-2)^9$

<u>SECTION – C</u>

27. The number of boys and girls in a class are in the ratio 7:5. The number of boys is 8 more than the number of girls. What is the total class strength?

28. Consider the following marks (out of 50) obtained in Mathematics by 60 students of Class VIII:

21, 10, 30, 22, 33, 5, 37, 12, 25, 42, 15, 39, 26, 32, 18, 27, 28, 19, 29, 35, 31, 24, 36, 18, 20, 38, 22, 44, 16, 24, 10, 27, 39, 28, 49, 29, 32, 23, 31, 21, 34, 22, 23, 36, 24, 36, 33, 47, 48, 50, 39, 20, 7, 16, 36, 45, 47, 30, 22, 17.

Construct a frequency distribution table for the data using intervals 0-10, 10-20 and so on.

29. Mary wants to decorate her Christmas tree. She wants to place the tree on a wooden box covered with coloured paper with picture of Santa Claus on it (see the below figure). She must know the exact quantity of paper to buy for this purpose. If the box has length, breadth and height as 80 cm, 40 cm and 20 cm respectively how many square sheets of paper of side 40 cm would she require?

30. Using identities, evaluate (i) 78×82 (ii) 8.9^2

31. Verify Euler's formula for these solids:
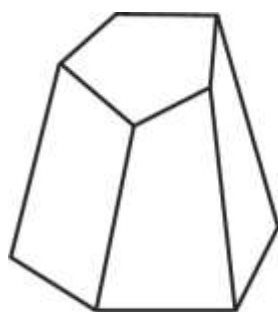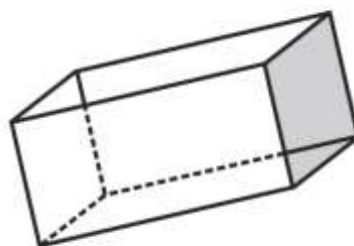
(i)   (ii)

32. Express the following numbers in standard form.
(i) 0.0000000000085
(ii) 0.00000000000942
(iii) 6020000000000000

33. If $31z5$ is a multiple of 3, where z is a digit, what might be the values of z?

34. Factorise: (i) $49y^2 + 84yz + 36z^2$ (ii) $16x^5 - 144x^3$

SECTION – D

35. In the following figure of a ship, ABDH and CEFG are two parallelograms. Find the value of x, y, z and w.
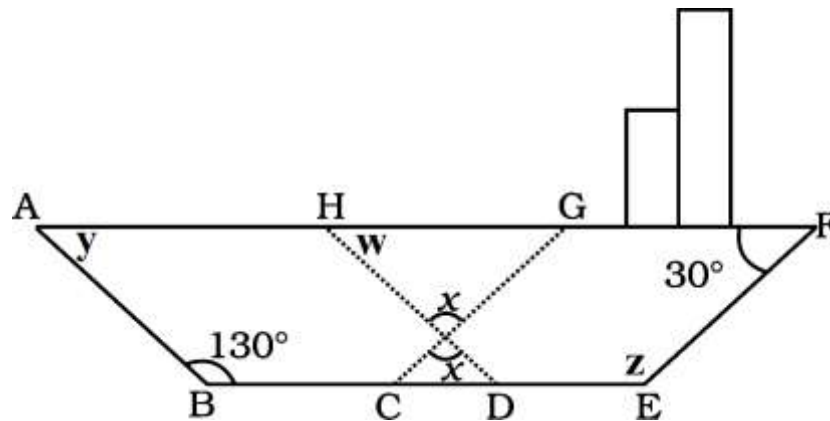
36. Campus and Welfare Committee of school is planning to develop a grey shade for painting the entire school building. For this purpose various shades are tried by mixing containers of blue paint and white paint. In each of the following mixtures, decide which is a lighter shade of grey and also find the lightest grey shade among all of them.
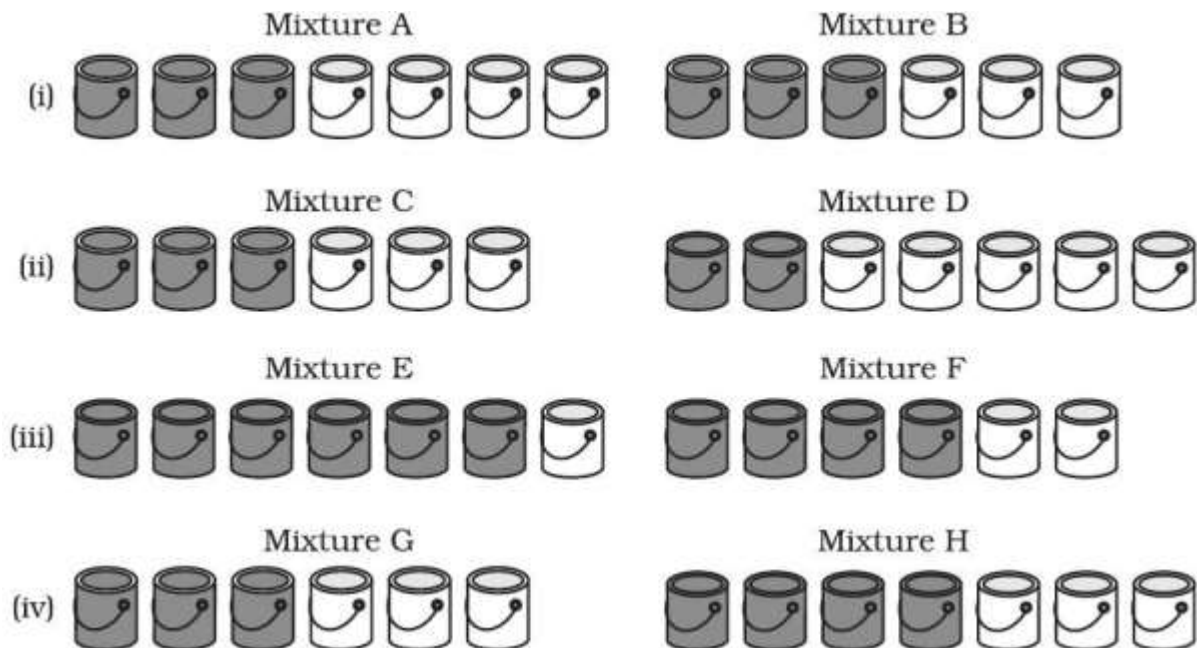
If one container has one litre paint and the building requires 105 litres for painting, how many container of each type is required to paint the building by darkest grey shade?

37. Plot the following points on same graph sheet. Verify if they lie on a line
(a) A(4, 0), B(4, 2), C(4, 6), D(4, 2.5)
(b) P(1, 1), Q(2, 2), R(3, 3), S(4, 4)

38. Factorise the expressions and divide them as directed.
(i) $(5p^2 - 25p + 20) \div (p - 1)$ (ii) $4yz(z^2 + 6z - 16) \div 2y(z + 8)$

39. Below are the drawings of cross sections of two different pipes used to fill swimming pools. Figure A is a combination of 2 pipes each having a radius of 8 cm. Figure B is a pipe having a radius of 15 cm. If the force of the flow of water coming out of the pipes is the same in both the cases, which will fill the swimming pool faster?

Figure A   8cm   8cm   Figure B   15cm
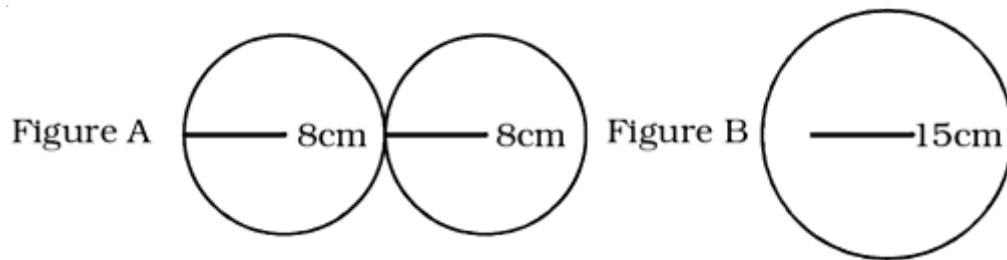
40. The following pie chart depicts the expenditure of a state government under different heads.
(i) If the total spending is 10 crores, how much money was spent on roads?
(ii) How many times is the amount of money spent on education compared to the amount spent on roads?
(iii) What fraction of the total expenditure is spent on both roads and public welfare together?

Public Welfare 20%
Road 10%
Education 25%
Others 45%
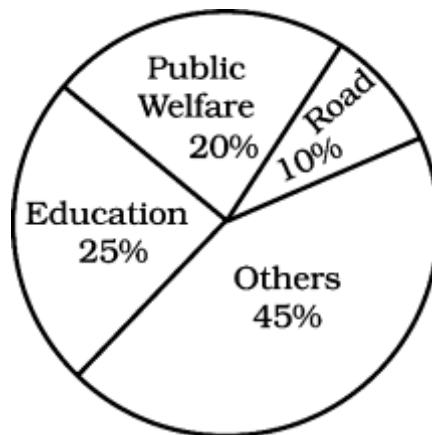
CLASS IX

SAMPLE PAPER 01 FOR SESSION ENDING EXAM (2019-20)

SUBJECT: MATHEMATICS   MAX. MARKS : 80

CLASS : IX   **DURATION : 3 HRS**

~~General Instruction:~~

(i) **All** questions are compulsory.

(ii) This question paper contains **30** questions divided into four Sections A, B, C and D.

(iii) **Section A** comprises of 6 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 10 questions of **3 marks** each and **Section D** comprises of 8 questions of **4 marks** each.

(iv) There is no overall choice. However, an internal choice has been provided in two questions in 1 mark each, two questions in 2 marks each, three questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

(v) Use of Calculators is not permitted

SECTION – A
Questions 1 to 20 carry 1 mark each.

1. The value of $\left(\sqrt{5}+\sqrt{2}\right)^2$ is:

(a) $7+2$ $\sqrt{5}$(b) $1+5$ $\sqrt{2}$ (c) $7+2\sqrt{10}$ (d) $7-2\sqrt{10}$

2. On rationalizing the denominator of $\dfrac{1}{\sqrt{5}+\sqrt{2}}$, we get

   (a) $\sqrt{5}-\sqrt{2}$ (b) $\sqrt{2}-\sqrt{5}$ (c) $\dfrac{\sqrt{5}-\sqrt{2}}{3}$ (d) $\dfrac{\sqrt{2}-\sqrt{5}}{3}$

3. Point (0, –2) lies:
   (a) on the x-axis   (b) in the II quadrant   (c) on the y-axis   (d) in the IV quadrant

4. Signs of the abscissa and ordinate of a point in the first quadrant are respectively:
   (a) +, +   (b) –, +   (c) +, –   (d) –, –

5. The graph of line x + y = 7 intersect the x-axis at:
       (a) (7, 0)   (b) (0, 7)   (c) (–7, 0)   (d) (0, –7)

6. Two adjacent angles on a straight line are in the ratio 5 : 4. then the measure of each one of these angles are

(a) 100^0 and 80^0 (b) 75^0 and 105^0 c) 90^0 and 90^0 (d) 60^0 and 120^0

7. A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc
   (a) 150^0 (b) 30º   (c) 60º   (d) none of these

8. In a triangle ABC, if $2\angle A = 3\angle B = 6\angle C$, then the measure of $\angle A$ is
   (a) 30^0 (b) 75^0 c) 90^0 (d) 60^0

9. The height of a cone is 15 cm. If its volume is 1570 cm3, find the radius of the base.

(a) 12 cm   (b) 10 cm   (c) 15 cm   (d) 18 cm

10. There are 6 marbles in a box with number 1 to6 marked on each of them . What is the probability of drawing a marble with number 2 ?

(a) $\dfrac{1}{6}$ (b) $\dfrac{1}{5}$ (c) $\dfrac{1}{3}$ (d) 1

11. The perpendicular distance of the point P(3,4) from the y – axis is _____

12. If the coordinates of two points P and Q are (2, –3) and (–6, 5), then the value of (x-coordinate of P) – (x-coordinate of Q) is _____

13. The graph of the linear equation $2x + 3y = 6$ is a line which meets the y-axis at the point is _____

14. If the diameter of a sphere is 14 m then the volume of this sphere is _____

15. The value of $32^{2/5}$ is _____

16. Find the height of cone, if its slant height is 34 cm and base diameter is 32 cm.

17. If the point (3, 4) lies on the graph of the equation $3y = ax + 7$, find the value of a.

18. Simplify: $\dfrac{\sqrt{32} + \sqrt{48}}{\sqrt{8} + \sqrt{12}}$

OR

Find the value of $\sqrt{3^{-2}}$.

19. If its perimeter of an equilateral triangle is 180 cm, what will be its area?

20. In the below figure, $\angle ABC = 69°$, $\angle ACB = 31°$, find $\angle BDC$.
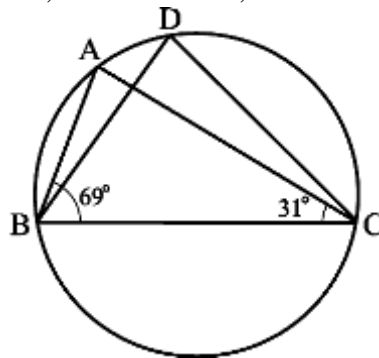
<u>SECTION – B</u>
Questions 21 to 26 carry 2 marks each.

21. A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water will fall into the sea in a minute?

22. Find the value of $x^3 + y^3 + 15xy - 125$ if $x + y = 5$.

OR

Find the remainder when $4x^3 - 3x^2 + 4x - 2$ is divided by (i) $x - 1$ (ii) $x - 2$

23. The following observations have been arranged in ascending order. If the median of the data is 63, find the value of x.

29, 32, 48, 50, x, x + 2, 72, 78, 84, 95

24. The angles of quadrilateral are in the ratio 3 : 5 : 9 : 13. Find all the angles of the quadrilateral.

25. Find the area of a triangle two sides of which are 18cm and 10cm and the perimeter is 42cm.

OR

Calculate the area of trapezium as shown in the figure:
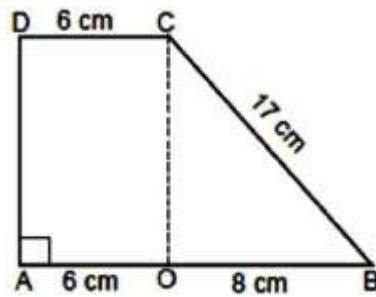
26. In the below figure, ABCD is a parallelogram, AE ⊥ DC and CF ⊥ AD. If AB = 16 cm, AE = 8 cm and CF = 10 cm, find AD.
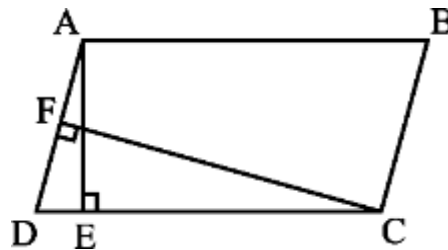
SECTION – C
Questions 27 to 34 carry 3 marks each.

27. In the below figure, ABCD is a quadrilateral and BE ‖ AC and also BE meets DC produced at E. Show that area of Δ ADE is equal to the area of the quadrilateral ABCD.
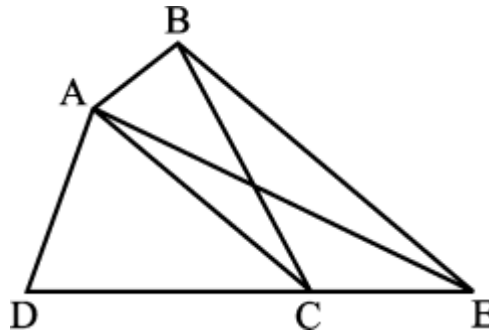
OR

Show that a median of a triangle divides it into two triangles of equal areas.

28. 12 defective ball pens are accidentally mixed with 156 good one. It is not possible to just look at pen and tell whether or not it is defective. The shopkeeper draws one pen at random.
(a) Determine the probability that the pen taken out is a good one.
(b) Suppose the pen drawn is defective. The shopkeeper did not sell out and kept the pen aside. He again draws one more pen at random from the rest. What is the probability that pen is not defective.

29. A man hires an auto rickshaw to cover a certain distance. The fare is Rs. 10 for first km and Rs. 7 for subsequent kilometers. Taking total distance covered as x km and total fare as y :
(a) Write a linear equation for this.
(b) The man covers a distance of 16 km and gave Rs. 120 to the auto driver. Auto driver said ''It is not the correct amount'' and returned him the balance. Find the correct amount paid back by the auto driver.

30. Factorise $x^3 - 23x^2 + 142x - 120$.

31. Priya participated in a drawing competition. She is required to make a design on a rectangular sheet of dimensions 50 cm × 70 cm. In the design she made 8 triangles, each of sides 26 cm, 17 cm and 25 cm as shown in the figure. Find the total area of the design and the remaining area of the tile.
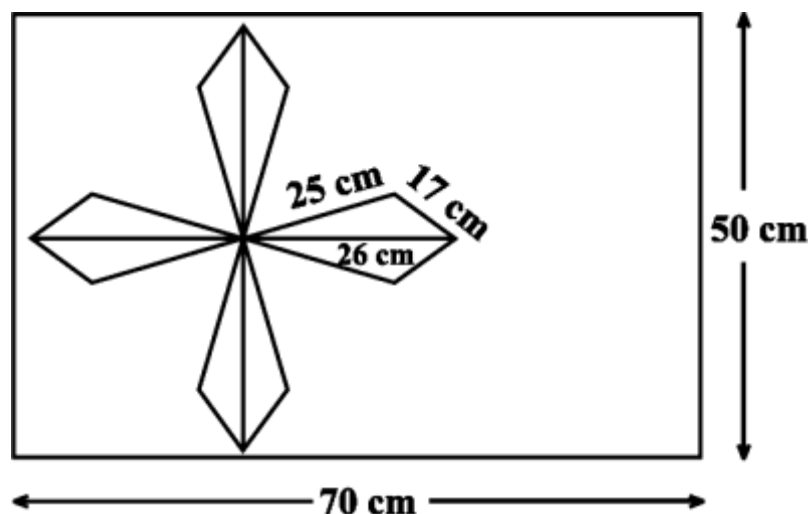
32. AB is a line-segment. P and Q are points on opposite sides of AB such that each of them is equidistant from the points A and B (see below left figure). Show that the line PQ is the perpendicular bisector of AB.
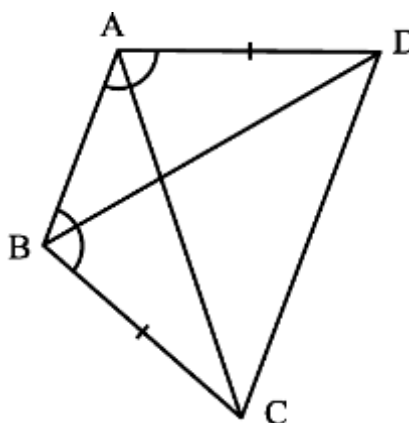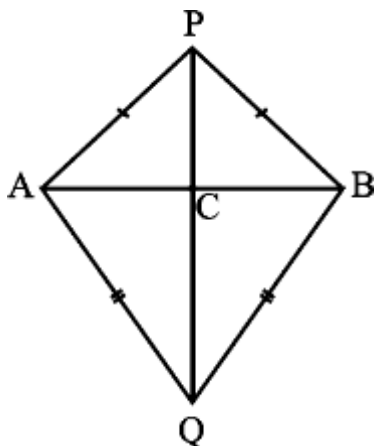
OR

ABCD is a quadrilateral in which AD = BC and ∠ DAB = ∠ CBA (see the above right sided figure). Prove that (i) △ ABD ≅ △ BAC (ii) BD = AC (iii) ∠ ABD = ∠ BAC.

33. In the below left figure, if AB || CD, CD || EF and y : z = 3 : 7, find x.

OR
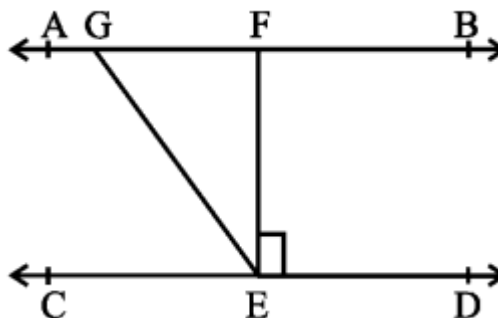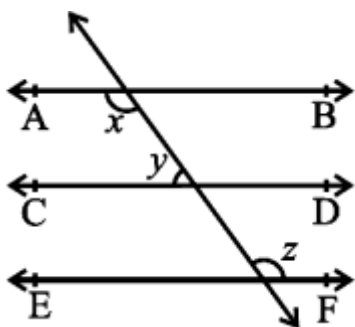
In the above right sided figure, if AB || CD, EF ⊥ CD and GED = 126°, find ∠ AGE, ∠ GEF and ∠ FGE.

34. Three girls Reshma, Salma and Mandip are playing a game by standing on a circle of radius 5m drawn in a park. Reshma throws a ball to Salma, Salma to Mandip, Mandip to Reshma. If the distance between Reshma and Salma and between Salma and Mandip is 6m each, what is the distance between Reshma and Mandip?

SECTION – D
Questions 35 to 40 carry 4 marks each.

35. Find the value of a and b in $\dfrac{5 + 2\sqrt{3}}{7 + 4\sqrt{3}} = a + b\sqrt{3}$

36. Ajay plans to erect an indoor greenhouse (herbarium) which is made entirely of glass panes (including base) held together with tape. It is 30 cm long, 25 cm wide and 25 cm high.
(a) What is the surface area of the glass used?
(b) How much of tape is needed for all the 12 edges?
(c) Which mathematical concept is used in the above problem?

OR

A Sweets stall placed an order to Mr. Aditya for making cardboard boxes for packing their sweets. Two sizes of boxes are ordered. The bigger of dimensions 25cm × 20cm × 5cm and the smaller of dimensions 15cm × 12cm × 5cm. For all the overlaps, 5% of the total surface is required extra. 250 boxes of each kind are required. Cost of the cardboard is Rs. 4 for 1000 cm^2. By mistake Sweets Stall made payment according to the bigger boxes, but Mr. Aditya returned back the excess money.
(a) What amount was returned back by Mr. Aditya to the Sweets Stall?
(b) Which mathematical concept is used in the above problem?

37. Construct a triangle XYZ in which $\angle$ Y = 30°, $\angle$ Z = 90° and XY + YZ + ZX = 11 cm.

38. Show that if the diagonals of a quadrilateral are equal and bisect each other at right angles, then it is a square.

OR

ABCD is a rhombus and P, Q, R and S are the mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral PQRS is a rectangle.

39. The following table gives the life times of 400 neon lamps:

Life time (in hours)	Number of Lamps
300 – 400	14
400 – 500	56
500 – 600	60
600 – 700	86
700 – 800	74
800 – 900	62
900 – 1000	48

(i) Represent the given information with the help of a histogram.
(ii) How many lamps have a life time of more than 700 hours?

40. If $x^3 + ax^2 + bx + 6$ has (x – 2) as a factor and leaves a remainder 3 when divided by (x – 3), find the values of a and b.

OR

Without actual division, prove that $2x^4 – 6x^3 + 3x^2 + 3x – 2$ is exactly divisible by $x^2 – 3x + 2$.

SAMPLE PAPER 02 FOR SESSION ENDING EXAM (2019-20)

SUBJECT: MATHEMATICS   MAX. MARKS : 80
CLASS : IX   **DURATION : 3 HRS**

~~**General Instruction:**~~

(i) **All** questions are compulsory.

(ii) This question paper contains **30** questions divided into four Sections A, B, C and D.

(iii) **Section A** comprises of 6 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 10 questions of **3 marks** each and **Section D** comprises of 8 questions of **4 marks** each.

(iv) There is no overall choice. However, an internal choice has been provided in two questions in 1 mark each, two questions in 2 marks each, three questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

(v) Use of Calculators is not permitted

SECTION – A

Questions 1 to 20 carry 1 mark each.

1. In a triangle ABC, if $\angle A + \angle B = 65^0$ and $\angle B + \angle C = 140^0$, then the measure of $\angle B$ is
   (a) 40^0 (b) 25^0 c) 115^0 (d) 60^0

2. Two adjacent angles on a straight line are in the ratio 5 : 4. then the measure of each one of these angles are
   (a) 100^0 and 80^0 (b) 75^0 and 105^0 c) 90^0 and 90^0 (d) 60^0 and 120^0

3. If (2, 0) is a solution of the linear equation 2x + 3y = k, then the value of k is
   (a) 4   (b) 6   (c) 5   (d) 2

4. 0.6666…. in $\frac{p}{q}$ form is:
   (a) $\frac{6}{99}$ (b) $\frac{2}{3}$ (c) $\frac{3}{5}$ (d) $\frac{6}{6}$

5. The value of $125^{\frac{-1}{3}}$ is :
   (a) $\frac{1}{5}$ (b) $\frac{1}{25}$ (c) $\frac{1}{15}$ (d) $\frac{1}{125}$

6. The coordinates of the point lying on the negative side of x-axis at a distance of 5 units from origin are
   (a) (0, 5)   (b) (0, –5)   (c) (–5, 0)   (d) (5, 0)

7. The distance of the (4, –3) from x – axis is
   (a) 3 units   (b) –3 units   (c) 4 units   (d) 5 units

8. The radius of the circle is 5 cm and distance of the chord from the centre of the circle is 4 cm. Find the length of the chord.
   (a) 8 cm   (b) 7 cm   (c) 6 cm   (d) 5 cm

9. The perimeter of floor of rectangular hall is 250m. The cost of the white washing its four walls is Rs. 15000 at the rate of Rs. 10 per m². The height of the room is
   (a) 5m   (b) 4m   (c) 6m   (d) 8m

10. A die is thrown once . What will be the probability of getting a prime number ?

    (a) $\dfrac{1}{6}$ (b) $\dfrac{1}{2}$ (c) 1   (d) 0

11. In graphical representation of $y = -4$, line is_____to x – axis.

12. The value of k, if $x = 2$, $y = 1$ is a solution of the equation $2x + 3y = k$ is _____

13. If the coordinates of two points P and Q are (2, –3) and (–6, 5), then the value of (x-coordinate of P) – (x-coordinate of Q) is _____

14. The coordinates of the point lying on x-axis and with x-coordinate 4 is _____

15. If the area of an equilateral triangle is $81\sqrt{3}$ cm², then its height is _____

16. Rationalize the denominator of $\dfrac{3 - \sqrt{2}}{3 + \sqrt{2}}$.

OR

Find the value of $(81)^{0.16} \times (81)^{0.09}$.

17. Express $2x = 5y$ in the form $ax + by + c = 0$

18. Two sides of a triangle are 13 cm and 14 cm and its semi-perimeter is 18 cm. Find the third side of this triangle.

OR

The height of an equilateral triangle measures $9\sqrt{3}$ cm. Find its area.

19. In the given figure, O is the centre of the circle and AB is a chord of the circle. If AOB = 110°, find $\angle APB$.
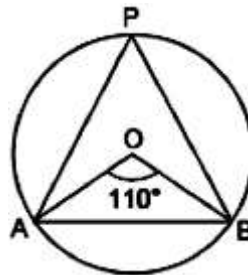
20. Find the height of cone, if its slant height is 34 cm and base diameter is 32 cm.

SECTION – B
Questions 21 to 26 carry 2 marks each.

21. Simplify $\dfrac{4 + \sqrt{5}}{4 - \sqrt{5}} + \dfrac{4 - \sqrt{5}}{4 + \sqrt{5}}$ by rationalizing the denominator.

22. Factorise: $27x^3 - \dfrac{1}{216} - \dfrac{9}{2}x^2 + \dfrac{1}{4}x$

OR

Find the value of k, if x + k is the factor of the polynomials:
(i) $x^3 + kx^2 - 2x + k + 5$
(ii) $x^4 - k^2x^2 + 3x - 6k$

23. The following number of goals were scored by a team in a series of 10 matches:
2, 3, 4, 5, 0, 1, 3, 3, 4, 3
Find the mean, median and mode of these scores.

24. A joker's cap is in the form of a right circular cone of base radius 7 cm and height 24 cm. Find the area of the sheet required to make 10 such caps.

OR

The radius of a spherical balloon increases from 7 cm to 14 cm as air is being pumped into it. Find the ratio of surface areas of the balloon in the two cases.

25. The angle between two altitudes of a parallelogram through the vertex of an obtuse angle of the parallelogram is 60^0. Find the angles of the parallelogram.

26. In the below figure, ABCD is a parallelogram; AB = 10 cm; BM = 8 cm and DL = 6 cm, then find AD.
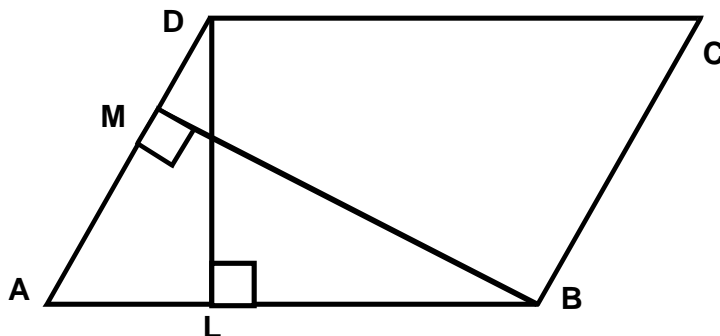
SECTION – C
Questions 27 to 34 carry 3 marks each.

27. In the below fig. ABCD is a parallelogram and BC is produced to a point Q such that AD = CQ. If AQ intersects DC at P, show that ar(ΔBPC) = ar(ΔDPQ⬚)

OR
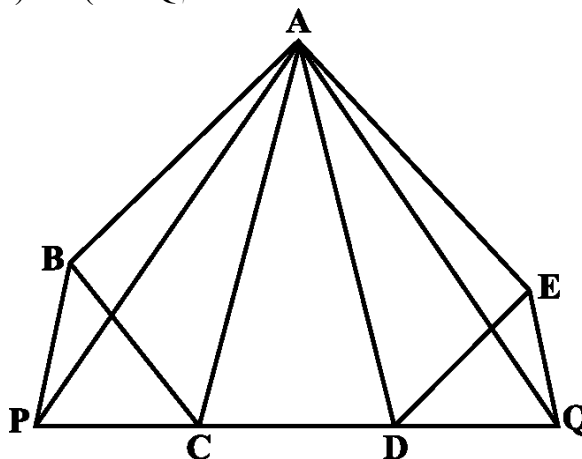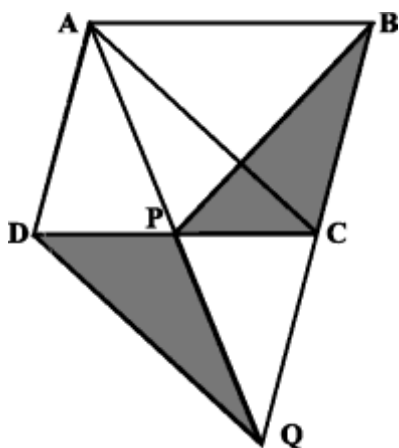
In the below figure, ABCDE is any pentagon. BP drawn parallel to AC meets DC produced at P and EQ drawn parallel to AD meets CD produced at Q. Prove that ar (ABCDE) = ar (APQ)

28. 1500 families with 2 children were selected randomly, and the following data were recorded:

Number of girls in a family	0	1	2
Number of families	475	814	211

Compute the probability of a family, chosen at random, having
(i) 2 girls (ii) 1 girl (iii) No girl

29. Line l is the bisector of an angle $\angle A$ and B is any point on l. BP and BQ are perpendiculars from B to the arms of $\angle A$ (see the below figure). Show that:
   (i) $\triangle APB \cong \triangle AQB$ (ii) BP = BQ or B is equidistant from the arms of $\angle A$.
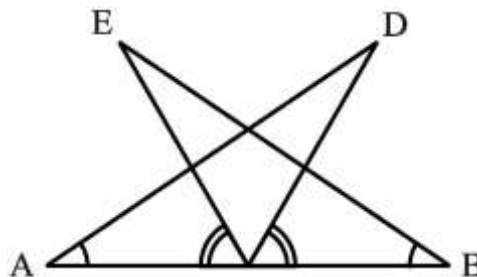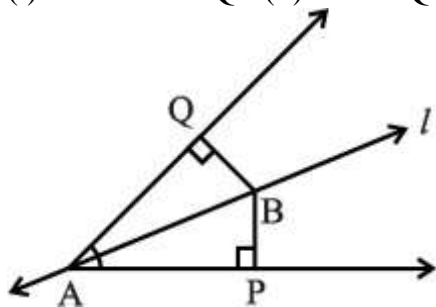
OR

AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that $\angle BAD = \angle ABE$ and $\angle EPA = \angle DPB$ (see the above right sided figure). Show that (i) $\triangle DAP \cong \triangle EBP$ (ii) AD = BE

30. Verify: (i) $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$ (ii) $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

31. Represent the real number $\sqrt{2}, \sqrt{3}, \sqrt{5}$ on a single number line.

32. In a flood affected area, the volunteers of NSS erected a conical tent made of tarpaulin. The vertical height of the conical tent is 4m and the base diameter is 6m. If the width of tarpaulin is 1.5m then find the length of the tarpaulin used, assuming that 10% extra material is required for stitching margins and wastage in cutting. (Take $\pi = 3.14$)

33. A circular park of radius 20m is situated in a colony. Three boys Ankur, Syed and David are sitting at equal distance on its boundary each having a toy telephone in his hands to talk each other. Find the length of the string of each phone.

34. In the adjoining figure, PQ and RS are two mirrors placed parallel to each other. An incident ray AB strikes the mirror PQ at B, the reflected ray moves along the path BC and strikes the mirror RS at C and again reflects back along CD. Prove that AB ∥ CD.
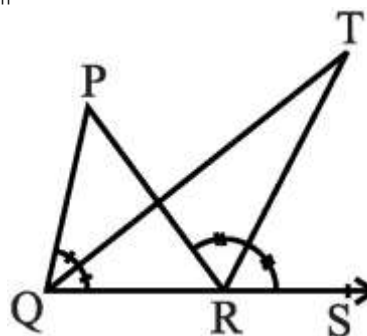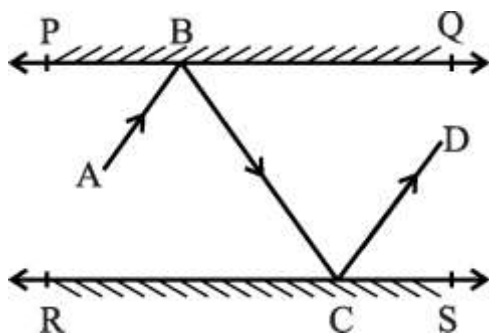
OR

In the above right sided figure, the side QR of PQR is produced to a point S. If the bisectors of $\angle PQR$ and $\angle PRS$ meet at point T, then prove that $\angle QTR = \dfrac{1}{2}\angle QPR$.

<u>SECTION – D</u>
Questions 35 to 40 carry 4 marks each.

35. Construct a triangle ABC, in which $\angle B = 60°$, $\angle C = 45°$ and AB + BC + CA = 11 cm.

36. Kamla has a triangular field with sides 240 m, 200 m, 360 m, where she grew wheat. In another triangular field with sides 240 m, 320 m, 400 m adjacent to the previous field, she wanted to grow potatoes and onions (see below figure). She divided the field in two parts by joining the mid-point of the longest side to the opposite vertex and grew potatoes in one part and onions in the other part. How much area (in hectares) has been used for wheat, potatoes and onions?

(1 hectare = 10000 m^2)
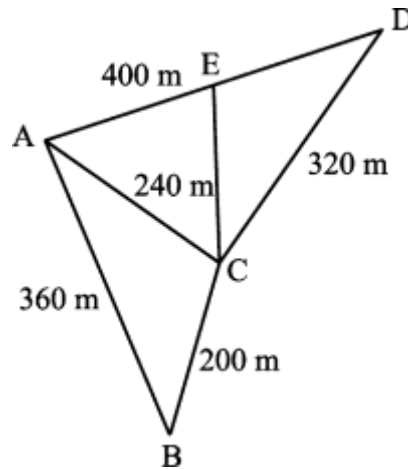
OR

A triangular park ABC has sides 120m, 80m and. A gardener *Dhania* has to put a fence all around it and also plant grass inside. How much area does she need to plant? Find the cost of fencing it with barbed wire at the rate of Rs 20 per metre leaving a space 3m wide for a gate on one side.
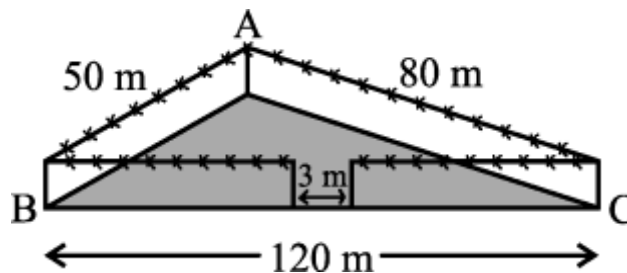
37. On his birthday, Manoj planned that this time he spent his birthday in a small orphanage centre. He bought apples to give to children and adults working there. Manoj donated 2 apples to each children and 3 apples to each adult working there along with Birthday cake. He distributed 60 total apples.

Based on the above situation, answer the following questions:

(i) Write a linear equation in two variables for the above situation in standard form.

(ii) Draw the graph for this situation.

(iii) How many children and adults are there in the orphanage?

38. The length of 40 leaves of a plant are measured correct to one millimetre, and the obtained data is represented in the following table:

Length (in mm)	118 – 126	127 – 135	136 – 144	145 – 153	154 – 162	163 – 171	172 – 180
Number of leaves	3	5	9	12	5	4	2

(i) Draw a histogram to represent the given data.

(ii) Is there any other suitable graphical representation for the same data?

(iii) Is it correct to conclude that the maximum number of leaves are 153 mm long? Why?

39. P, Q, R and S are respectively the mid-points of the sides AB, BC, CD and DA of a quadrilateral ABCD such that AC $\perp$ BD. Prove that PQRS is a rectangle.

OR

ABC is a triangle right angled at C. A line through the mid-point M of hypotenuse AB and parallel to BC intersects AC at D. Show that

(i) D is the mid-point of AC

(ii) MD $\perp$ AC

(iii) $CM = MA = \dfrac{1}{2} AB$

40. Find the values of a and b so that the polynomial $x^3 - 10x^2 + ax + b$ is exactly divisible by $(x - 1)$ as well as $(x - 2)$.

OR

Without actual division, prove that $2x^4 - 5x^3 + 2x^2 - x + 2$ is divisible by $x^2 - 3x + 2$.

SAMPLE PAPER 03 FOR SESSION ENDING EXAM (2019-20)

SUBJECT: MATHEMATICS   MAX. MARKS : 80

CLASS : IX   **DURATION : 3 HRS**

~~**General Instruction:**~~

 (i) **All** questions are compulsory.

(ii) This question paper contains **30** questions divided into four Sections A, B, C and D.

(iii) **Section A** comprises of 6 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 10 questions of **3 marks** each and **Section D** comprises of 8 questions of **4 marks** each.

(iv) There is no overall choice. However, an internal choice has been provided in two questions in 1 mark each, two questions in 2 marks each, three questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

(v) Use of Calculators is not permitted

SECTION – A
Questions 1 to 20 carry 1 mark each.

1. The value of $p(x) = 5x – 4x^2 + 3$ for $x = – 1$ is:
    (a) 6   (b) –6   (c) 3   (d) – 3

2. In $2 – x^2 + x^3$ the coefficient of x^2 is:
    (a) 2   (b) 1   (c) – 2   (d) –1

3. The value of $64^{\frac{1}{2}}$ is :
(a) 8   (b) 4   (c) 16   (d) 32

4. On rationalizing the denominator of $\dfrac{1}{\sqrt{3} – \sqrt{2}}$, we get

    (a) $\dfrac{1}{\sqrt{3} + \sqrt{2}}$ (b) $\sqrt{3} + \sqrt{2}$ (c) $\sqrt{2} – \sqrt{3}$ (d) $– \sqrt{3} – \sqrt{2}$

5. Two lines PQ and RS intersect at O. If $\angle POR = 50^0$, then value of $\angle ROQ$ is
    (a) 120^0 (b) 130^0 (c) 90^0 (d) 150^0

6. Point (4, 1) lies on the line:
(a) $x + 2y = 5$ (b) $x + 2y = –6$ (c) $x + 2y = 6$ (d) $x + 2y = 16$

7. In a triangle, the sum of its two sides is_____third side.
    (a) equal to   (b) less than   (c) greater than   (d) none of these

8. The total surface area of a cube is 96 cm^2. The volume of the cube is:
(a) 8 cm^3 (b) 512 cm^3 (c) 64 cm^3 (d) 27 cm^3

9. In the below figure, if ∠ABC = 20°, then ∠AOC is equal to:

(a) 20°   (b) 40°   (c) 60°   (d) 10°
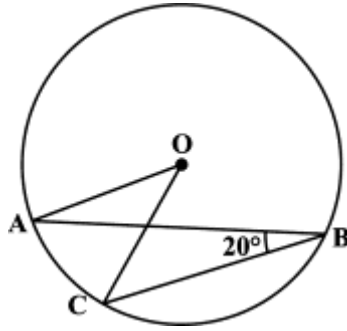
10. 10 defective pens are accidentally mixed with 90 good ones. It is not possible to just look at a pen and tell whether or not it is defective. One pen is taken out at random from this lot. Determine the probability that the pen taken out is a good one.

(a) 0.10   (b) 0.20   (c) 0.90   (d) 1.0

11. The perimeter of an equilateral triangle is 60 m. The area is _____

12. If x – 2 is a factor of $x^3 – 3x + 5a$ then the value of a is _____

13. The value of the polynomial $y^2 – 5y + 6$ at y = – 1 is _____

14. The points where the graph of the equation $3x + 4y = 12$ cuts the y-axis is _____

15. A rabbit covers y metres distance by walking 10 metres in slow motion and the remaining by x jumps, each jump contains 2 metres. This information is express in linear equation _____

16. An isosceles right triangle has area 8 cm². Find the length of its hypotenuse.

17. Express 2x = –4y + 5 in the form of ax + by + c = 0

18. In the below figure, ∠ABC = 45°, prove that OA ⊥ OC.
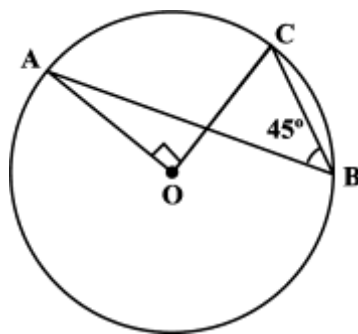
19. What is the total surface area of a hemisphere of base radius 7cm?

OR

The surface area of two hemispheres are in the ratio 25 : 49. Find the ratio of their radii.

20. Write a rational number between $\sqrt{2}$ and $\sqrt{3}$.

OR

Rationalize the denominator : $\dfrac{7 - 3\sqrt{2}}{7 + 3\sqrt{2}}$

SECTION – B
Questions 21 to 26 carry 2 marks each.

21. Write the value of $\left[\left(\dfrac{x^a}{x^b}\right)^{a+b} \times \left(\dfrac{x^b}{x^c}\right)^{b+c} \times \left(\dfrac{x^c}{x^a}\right)^{c+a}\right]$

22. Using suitable identity, evaluate $(-32)^3 + (18)^3 + (14)^3$

OR

If $f(x) = x^2 - 4x + 6$, find $f(1) - f(-1)$

23. If angles A, B, C and D of the quadrilateral ABCD, taken in order, are in the ratio 3 : 7 : 6 : 4, then name the type of quadrilateral ABCD.

24. Diagonals AC and BD of a quadrilateral ABCD intersect each other at P. Show that ar(APB) × ar(CPD) = ar(APD) × ar(BPC)

25. Find the median and mode of 14, 25, 14, 28, 18, 17, 18, 14, 23, 22, 14, 18.

OR

The mean of the observations x, 2x + 1, 2x + 5 and 2x + 9 is 30. What is the mean of first three observations?

26. How many square metres of canvas is required for a conical tent whose height is 3.5 m and the radius of whose base is 12 m?

SECTION – C
Questions 27 to 34 carry 3 marks each.

27. In the given figure, $\angle 1 = 55°$, $\angle 2 = 20°$, $\angle 3 = 35°$ and $\angle 4 = 145°$. Prove that AB ∥ CD.

OR
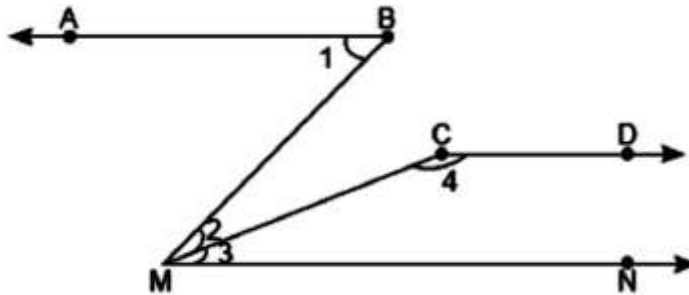
Side QR of Δ PQR is produced to a point S as shown in the figure. The bisector of P meets QR at T. Prove that $\angle$ PQR + $\angle$ PRS = 2 $\angle$ PTR.
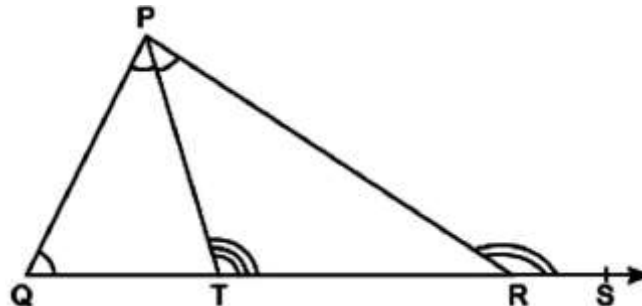
28. Find the value of a and b, if $\dfrac{2-\sqrt{5}}{2+3\sqrt{5}} = a\sqrt{5}+b$

29. If $2x + 3y = 12$ and $xy = 6$, find the value of $8x^3 + 27y^3$.

30. If the altitude drawn from the vertices of ABC to the opposite sides are equal, prove that the triangle is equilateral.

OR

Prove that the sum of any two sides of a triangle is greater than the third side.

31. A cloth having an area of 165 m^2 is shaped into the form of a conical tent of radius 5 m.

(i) How many students can sit in the tent if a student, on an average, occupies $\frac{5}{7}$ m^2 on the ground?

(ii) Find the volume of the cone.

32. ABCD is a parallelogram. E is a point on BA such that BE = 2EA and F is a point on DC such that DF = 2FC. Prove that AECF is a parallelogram whose area is one-third of the area of parallelogram ABCD.

OR

In ABC, D is the mid-point of AB and P is any point on BC. If CQ || PD meets AB in Q in the given below left figure, then prove that ar($\triangle$ BPQ) = ar($\triangle$ ABC)
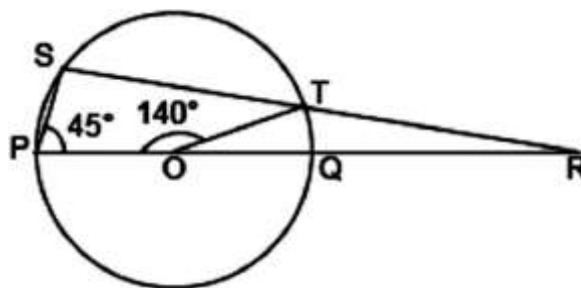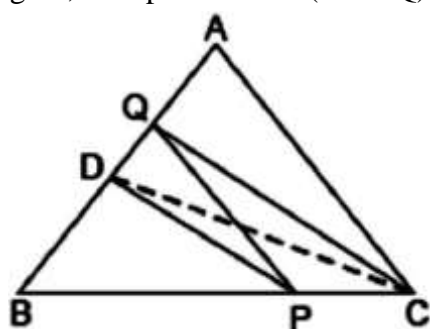
33. If O is centre of circle as shown in above right figure, find $\angle$ RQT and $\angle$ RTQ

34. A die is thrown 1000 times with the frequencies for the outcomes 1, 2, 3, 4, 5 and 6 as given in the following table :

Outcome	1	2	3	4	5	6
Frequency	179	150	157	149	175	190

Find the probability of getting each outcome.

SECTION – D
Questions 35 to 40 carry 4 marks each.

35. A triangular park has (5, 4), (0, 0) and (5, 0) vertices,
(i) Find the area of this park by plotting them on the graph.
(ii) If 10 plants can be planted in one square unit area. Then, how many plants can be planted in the park. How is this beneficial to the society?
(iii) Write the coordinates of the point whose sign cannot be changed? What values in our life this point indicates?

36. l, m and n are three parallel lines intersected by transversals p and q such that l, m and n cut off equal intercepts AB and BC on p. Show that l, m and n cut off equal intercepts DE and EF on q also.

OR

Show that the quadrilateral formed by joining the mid-points of the sides of a square, is also a square.

37. In a class, number of girls is x and that of boys is y. Also, the number of girls is 10 more than the number of boys. Write the given data in the form of a linear equation in two variables. Also, represent it graphically. Find graphically the number of girls, if the number of boys is 20.

OR

In a housing society people decided to do Rainwater harvesting. Rainwater is collected in the underground tank at the rate of 30 cm³/sec. Taking volume of water collected in x sec as y cm³.

    (a) Form a linear equation and write it in standard form.

    (b) Draw its graph

38. Students of a school staged a rally for cleanliness campaign. They walked through the lanes in two groups. One group walked through the lanes AB, BC and CA; while the other through AC, CD and DA (see the below figure). Then they cleaned the area enclosed within their lanes. If AB = 9 m, BC = 40 m, CD = 15 m, DA = 28 m and ∠ B = 90°, which group cleaned more area and by how much? Find the total area cleaned by the students (neglecting the width of the lanes).
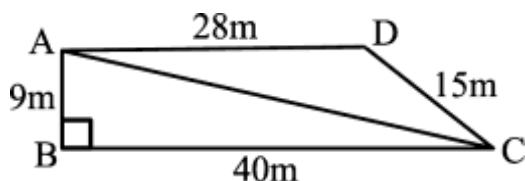
OR

The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 122 m, 22 m and 120 m (see the below figure). The advertisements yield an earning of Rs 5000 per m² per year. A company hired one of its walls for 3 months. How much rent did it pay? Another company hired the other side of its walls for 9 months. How much rent did it pay?
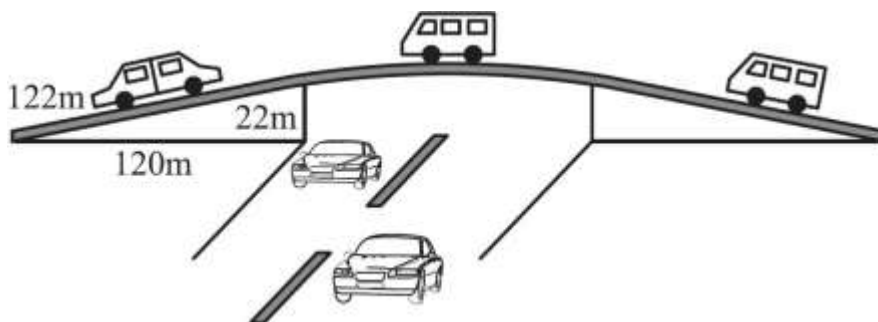
39. As a part of Corporate Social Responsibility (CSR) activity, an industrialist wishes to construct a hospital for animals on a triangular shaped plot.

    (i) Construct a triangle for the same in which BC = 8 m, ∠ B = 45° and AB − AC = 3.5 m by using proper scale.

    (ii) What ideas are promoted by the industrialist?

40. A random survey of the number of children of various age groups playing in a park was found as follows:

Age (in years)	Number of children
1 – 2	5
2 – 3	3
3 – 5	3
5 – 7	12
7 – 10	9
10 – 15	10
15 – 17	4

Draw a histogram to represent the data above.

SUBJECT: MATHEMATICS   MAX. MARKS : 80
CLASS : IX   **DURATION : 3 HRS**

General Instruction:
 (i) **All** questions are compulsory.
(ii) This question paper contains **30** questions divided into four Sections A, B, C and D.
(iii) **Section A** comprises of 6 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 10 questions of **3 marks** each and **Section D** comprises of 8 questions of **4 marks** each.
(iv) There is no overall choice. However, an internal choice has been provided in two questions in 1 mark each, two questions in 2 marks each, three questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
(v) Use of Calculators is not permitted

SECTION – A
Questions 1 to 20 carry 1 mark each.

1. The zero of $p(x) = 9x + 4$ is:
   (a) $\dfrac{4}{9}$ (b) $\dfrac{9}{4}$ (c) $\dfrac{-4}{9}$ (d) $\dfrac{-9}{4}$

2. If $x + 2$ is a factor of $x^3 + 2ax^2 + ax - 1$ then the value of a is:
   (a) $\dfrac{2}{3}$ (b) $\dfrac{3}{5}$ (c) $\dfrac{3}{2}$ (d) $\dfrac{1}{2}$

3. The rationalizing factor of $7 - 2\sqrt{3}$ is
   (a) $7 - 2\sqrt{3}$ (b) $7 + 2\sqrt{3}$ (c) $5 + 2\sqrt{3}$ (d) $4 + 2\sqrt{3}$

4. If $\dfrac{1}{7} = 0.\overline{142857}$, then $\dfrac{4}{7}$ equals
   (a) $0.\overline{428571}$ (b) $0.\overline{571428}$ (c) $0.\overline{857142}$ (d) $0.\overline{285718}$

5. If O is the centre of the circle as shown in figure, find CBD.
   (a) 55^0 (b) 65^0 (c) 55^0 (d) none of these
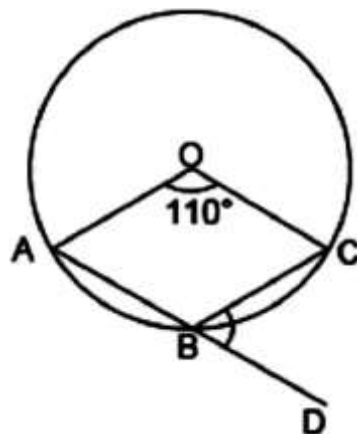
6. Point (4, 1) lies on the line:
   (a) $x + 2y = 5$ (b) $x + 2y = -6$ (c) $x + 2y = 6$ (d) $x + 2y = 16$

7. If two straight lines intersect each other in such a way that one of the angles so formed measure 90^0, then each of the remaining angles measures is
   (a) 50^0 (b) 75^0 (c) 90^0 (d) none of these

8. In a triangle ABC, if $\angle A + \angle B = 65^0$ and $\angle B + \angle C = 140^0$, then the measure of $\angle A$ is
   (a) 40^0 (b) 25^0 (c) 115^0 (d) 60^0

9. The height of a cone is 15 cm. If its volume is 1570 cm^3, find the radius of the base.
   (a) 12 cm   (b) 10 cm   (c) 15 cm   (d) 18 cm

10. Cards are marked with numbers 1 to 25 are placed in the box and mixed thoroughly. One card is drawn at random from the box. What is the probability of getting a number 5?
   (a) 1   (b) 0   (c) $\dfrac{1}{25}$ (d) $\dfrac{1}{5}$

11. $3\dfrac{3}{8}$ in decimal form is _____

12. The point on which the graph of the linear equation $2x - y = 7$ cuts the y-axis is _____

13. On dividing $x^3 + 3x^2 + 3x + 1$ by $5 + 2x$ we get remainder = _____

14. If $x + y + z = 0$ then $x^3 + y^3 + z^3$ is equal to _____

15. The volume of a sphere is 524 cm^3. The diameter of sphere is _____

16. The inner diameter of a circular well is 3.5 m. It is 10 m deep. Find its inner curved surface area.

17. If the area of an equilateral triangle is $16\sqrt{3}$ cm^2, then find the perimeter of the triangle.

OR

Find the area of an isosceles triangle each of whose equal sides is 13 m and whose base is 24 m.

18. Simplify: $16^{\frac{1}{2}}.25^{\frac{1}{2}}$

19. Find the length of a chord, which is at a distance of 24 cm from the centre of a circle whose diameter is 50 cm.

20. Find the value of k, if $x = 2$, $y = 1$ is a solution of the equation $2x + 3y = k$.

OR

At what point the graph of the linear equation $x + y = 5$ cuts the x-axis?

SECTION – B
Questions 21 to 26 carry 2 marks each.

21. Factorise: $8a^3 + b^3 + 12a^2b + 6ab^2$

OR

Factorise $y^2 - 5y + 6$

22. In a one-day International Cricket match, played between India and England in Kanpur, two Indian batsmen, Yuvraj Singh and M.S. Dhoni scored 200 in a partnership including 5 extra runs. Express this information in the form of an equation.

23. If angles A, B, C and D of the quadrilateral ABCD, taken in order, are in the ratio 3 : 7 : 6 : 4, then name the type of quadrilateral ABCD.

24. D and E are the mid-points of BC and AD respectively of ABC. If area of $\triangle ABC = 20$ cm2, find area of $\triangle EBD$.

25. Find the area of a triangle two sides of which are 18cm and 10cm and the perimeter is 42cm.

OR

Sides of a triangle are in the ratio of 12 : 17 : 25 and its perimeter is 540cm. Find its area.

26. The following observations have been arranged in ascending order. If the median of the data is 23.5, find the value of x.

12, 16, 17, 19, x, x + 3, 27, 37, 38, 40

SECTION – C
Questions 27 to 34 carry 3 marks each.

27. A city welfare society has organized "An Eye Camp" under prominent eye surgeons in which 100 persons visited the camp. If x persons belong to senior citizens who are above the age of 65 years and y persons belongs to others, then
(i) Formulate the word problem in a linear equation in two variables.
(ii) Draw the graph for this situation.

28. A farmer has two pieces of land in a parallelogram shape on the same base. He grows vegetables and flowers in two triangular pieces of land as shown in diagram:
(i) Check whether the two triangular pieces of land are equal in areas.
(ii) What values are being displayed by the farmer?
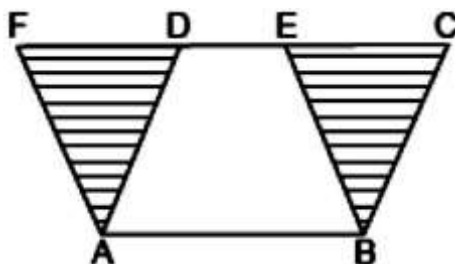
29. If a + b + c = 0, then prove that $\dfrac{(b+c)^2}{3bc} + \dfrac{(c+a)^2}{3ca} + \dfrac{(a+b)^2}{3ab} = 1$

30. In the above right sided figure, the side QR of PQR is produced to a point S. If the bisectors of ∠PQR and ∠PRS meet at point T, then prove that $\angle QTR = \dfrac{1}{2} \angle QPR$.

OR
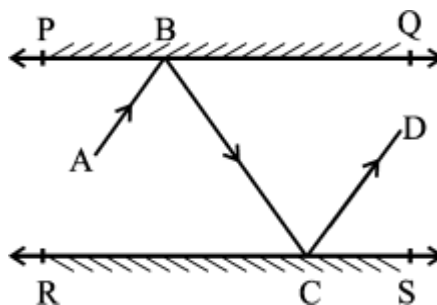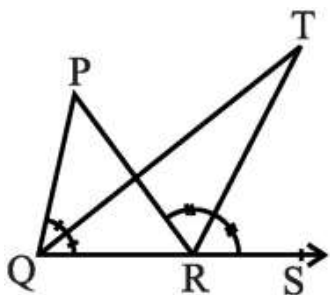
In the above right sided figure, PQ and RS are two mirrors placed parallel to each other. An incident ray AB strikes the mirror PQ at B, the reflected ray moves along the path BC and strikes the mirror RS at C and again reflects back along the path CD. Prove that AB || CD.

31. In Δ ABC, D, E and F are respectively the mid-points of sides AB, BC and CA. Show that Δ ABC is divided into four congruent triangles by joining D, E and F.

OR

Prove that "The quadrilateral formed by joining the mid-points of the sides of a quadrilateral, in order, is a parallelogram."

32. Aditi has a piece of land which is in the shape of a rhombus (see below left figure). She wants her one daughter and one son to work on the land and produce different crops. She divided the land in two equal parts. If the perimeter of the land is 400 m and one of the diagonals is 160 m, how much area each of them will get for their crops?
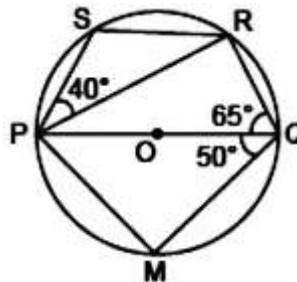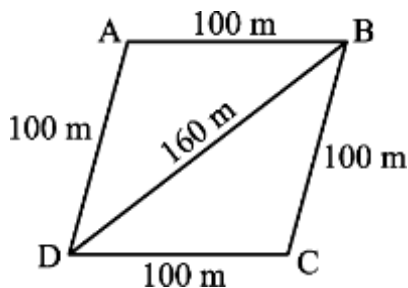
33. In the above right sided figure, PQ is a diameter of a circle with centre O. If ∠PQR = 65°, ∠SPR = 40°, ∠PQM = 50°, find ∠QPR, ∠PRS and ∠QPM.

34. A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8. What is the probability that it will point at
(i) 8 ?
(ii) an odd number?
(iii) a number greater than 2?

OR

A purse contains a number of Rs. l, Rs. 2 and Rs. 5 coins as given below:

Rs. 1	Rs. 2	Rs. 5
10	14	14

If from the purse a coin is taken out at random, then find the probability that the coin
(i) is not a Rs. 1 coin   (ii) is a Rs. 3 coin

SECTION – D
Questions 35 to 40 carry 4 marks each.

35. If $x = \dfrac{\sqrt{5}-2}{\sqrt{5}+2}$ and $y = \dfrac{\sqrt{5}+2}{\sqrt{5}-2}$, then find the value of $x^2 + y^2 - xy$.

OR

Find the values of a and b if $\dfrac{\sqrt{7}-1}{\sqrt{7}+1} - \dfrac{\sqrt{7}+1}{\sqrt{7}-1} = a + b\sqrt{7}$

36. Draw points A (0, 4), B (–4, 0), C(0, –4) and D(4, 0) on a graph paper. If a student starts from point A to B, then B to C, then C to D and then D to A, find total distance travelled by him. What type of quadrilateral is formed? If this area is used for planting some trees, then how many trees can be planted assuming 10 plants can be accommodated in 10 square units area?

37. There are 100 students in a blind school. Mr. and Mrs. Ramesh wished to serve them milk. They have two options for serving the milk.

Option A – A hemispherical bowl with radius 10.5 cm made up of ecofriendly material.

Option B – A hemispherical bowl with radius 7 cm made up of plastic.

    (a) How many litres of milk is required if option A is taken.

    (b) Find the total quantity of milk (in litres) if option B is taken.

38. A student Ram wishes to find the width AB of the river without crossing it. His friend Shyam helps him to complete the task. Ram stands at point X just opposite to a fixed pole at A on the other side of the river, Shyam measures the distance between point X and B using a measuring tape. Now, he asked Ram to stand at a point Y such that XB = YB. From point Y, he went perpendicular to the bank of river and reached to a point 'C' such that A, B and C lies on the same straight line. He measures the distance YC and determines the width of the river.
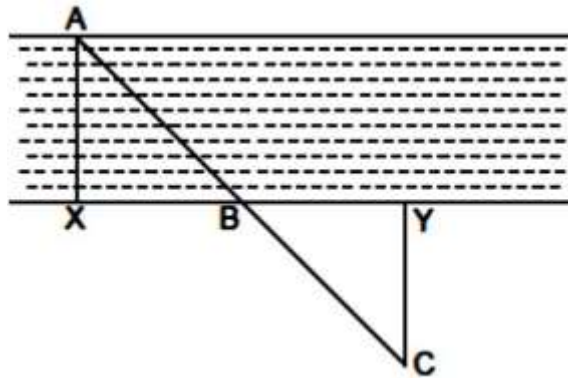
    (i) Justify the determination of width of river by measuring the distance YC.

    (ii) What values Shyam is exhibiting by doing so?

39. Delhi traffic police wants to make a traffic signal board of the shape of an equilateral triangle of side 5 m to make the people aware of the traffic rules. Construct the above traffic signal board by taking each side as 5 cm (instead of m).

OR

Aditya has a triangular piece of land ABC in which $\angle B = 30°$, $\angle C = 90°$ and the perimeter of the land is 11 m. He donated this to a vridhashram. Construct a triangle using above dimensions (use cm in place of m).

40. Given below are the seats won by different political parties in the polling outcomes of a state assembly election.

Political Parties	A	B	C	D	E	F
Seats won	75	55	37	29	10	37

    (i) Draw a suitable graph to represent the polling result.

    (ii) Which political party Won the maximum number of seats?

OR

Mean of 50 observations was found to be 80.4. But later on, it was discovered that 96 was misread as 69 at one place. Find the correct mean. If in each observation a constant value 'k' is added , how is the mean affected?

SAMPLE PAPER 05 FOR SESSION ENDING EXAM (2019-20)

SUBJECT: MATHEMATICS   MAX. MARKS : 80
CLASS : IX   **DURATION : 3 HRS**

General Instruction:

(i) **All** questions are compulsory.
(ii) This question paper contains **30** questions divided into four Sections A, B, C and D.
(iii) **Section A** comprises of 6 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 10 questions of **3 marks** each and **Section D** comprises of 8 questions of **4 marks** each.
(iv) There is no overall choice. However, an internal choice has been provided in two questions in 1 mark each, two questions in 2 marks each, three questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
(v) Use of Calculators is not permitted

SECTION – A
Questions 1 to 20 carry 1 mark each.

1. Point $(-6, 4)$ lies in the quadrant:
   (a) I   (b) II   (c) III   (d) IV

2. On rationalizing the denominator of $\dfrac{1}{2-\sqrt{3}}$, we get
   (a) $2-\sqrt{3}$ (b) $\sqrt{3}-2$ (c) $2+\sqrt{3}$ (d) $-\sqrt{3}-2$

3. The value of $\left(\sqrt{5}+\sqrt{2}\right)^2$ is:
   (a) $7+2\sqrt{5}$ (b) $1+5\sqrt{2}$ (c) $7+2\sqrt{10}$ (d) $7-2\sqrt{10}$

4. If $x + 2$ is a factor of $x^3 + 2ax^2 + ax - 1$ then the value of a is:
   (a) $\dfrac{2}{3}$ (b) $\dfrac{3}{5}$ (c) $\dfrac{3}{2}$ (d) $\dfrac{1}{2}$

5. On dividing $x^3 + 3x^2 + 3x + 1$ by x we get remainder:
   (a) 1   (b) 0   (c) -1 (d) 2

6. The length of a chord of circle of radius 10 cm is 12 cm. Determine the distance of the chord from the centre
   (a) 8 cm   (b) 7 cm   (c) 6 cm   (d) 5 cm

7. The curved surface area of a cylinder of height 14 cm is 88 cm². The diameter of its circular base is
   (a) 5cm   (b) 4cm   (c) 3cm   (d) 2cm

8. In a right angled triangle, _____ is the longest side.
   (a) perpendicular   (b) hypotenuse   (c) base   (d) none of these

9. The angle which is two times its complement is
   (a) 60^0 (b) 30^0 c) 45^0 (d) 72^0

10. A box contains 5 red marbles, 6 white marbles and 4 green marbles. If a marble is drawn at random from the box, What is the probability that the marble will be white?

    (a) $\dfrac{1}{6}$ (b) $\dfrac{2}{3}$ (c) $\dfrac{1}{3}$ (d) 1

11. If -1 is a zero of the polynomial $p(x) = ax^3 - x^2 + x + 4$, then the value of 'a' is _____

12. Two cubes each of edge 12 cm are joined. The surface area of new cuboid is _____

13. An irrational number between $\sqrt{2}$ and $\sqrt{3}$ is _____

14. The point on which the graph of the linear equation $x + y = 5$ cuts the x-axis is _____

15. The factors of $12x^2 - 7x + 1$ are _____

16. Simplify: $\sqrt{72} + \sqrt{800} - \sqrt{18}$

OR

Simplify: $343^{-\frac{1}{3}}$

17. Write the linear equation such that each point on its graph has an ordinate 3 times its abscissa.

18. Find the height of cone, if its slant height is 34 cm and base diameter is 32 cm.

19. If the area of an equilateral triangle is $36\sqrt{3}$ cm^2, then find its perimeter.

OR

Find the area of an isosceles triangle having base 2 cm and the length of one of the equal sides 4 cm.

20. In the above sided Fig., A, B, C and D are four points on a circle. AC and BD intersect at a point E such that $\angle BEC = 130°$ and $\angle ECD = 20°$. Find $\angle BAC$.
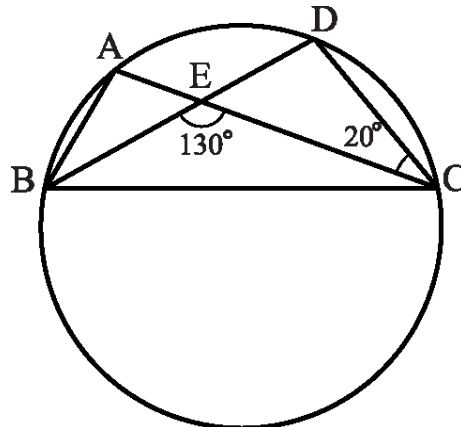
SECTION – B
Questions 21 to 26 carry 2 marks each.

21. Find the area of a triangle, two sides of which are 8 cm and 11 cm and the perimeter is 32 cm

OR

The sides of a triangular plot are in the ratio of 3 : 5 : 7 and its perimeter is 300 m. Find its area.

22. ABCD is a parallelogram. P is any point on CD. If ar($\triangle DPA$) = 18 cm^2 and ar($\triangle APC$) = 30 cm^2, find the area of $\triangle APB$.

23. The points scored by a basket ball team in a series of matches are as follows:

17, 2, 7, 27, 25, 5, 14, 18, 10, 24, 48, 10, 8, 7, 10, 28.

Find the median and mode for the data.

24. Find the remainder when $4x^3 - 3x^2 + 4x - 2$ is divided by (i) x – 1 (ii) x – 2

OR

Examine whether x – 1 is a factor of the following polynomials:

(i) $2x^3 - 5x^2 + x + 2$ (ii) $4x^3 + 5x^2 - 3x + 6$

25. Find the value of a and b, if the lines $2ax + 3by = 18$ and $5ax + 3by = 15$ pass through (1, 1).

26. In the given figure, AP and CP are bisectors of A and C respectively and $l \parallel m$. Find the measure of $\angle$ APC.
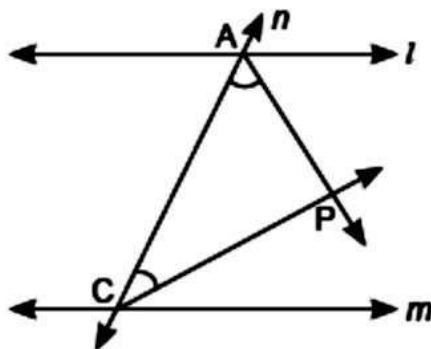
<u>SECTION – C</u>
Questions 27 to 34 carry 3 marks each.

27. Given area (ΔOAB) = area (ΔOPQ). Find the ordinate of point A.
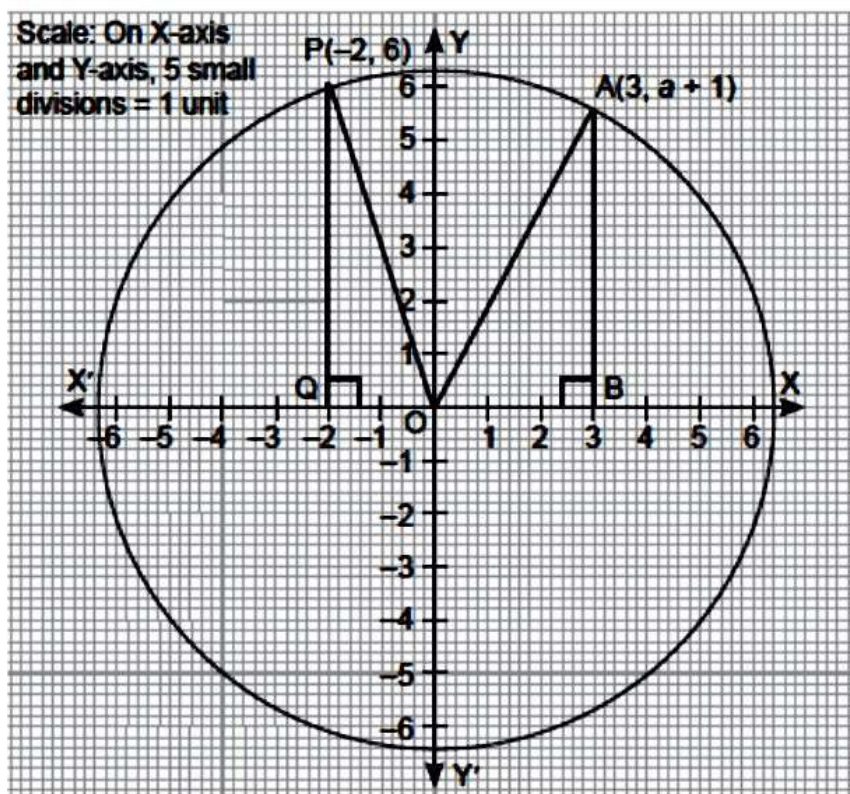
28. ABCD is a parallelogram. The circles through A, B and C intersect CD (produced, if necessary) at E. Prove that AE = AD.

OR

In the given figure, ABC is a triangle in which ∠ BAC = 30°. Show that BC is equal to the radius of the circumcircle of ΔABC, whose centre is O.
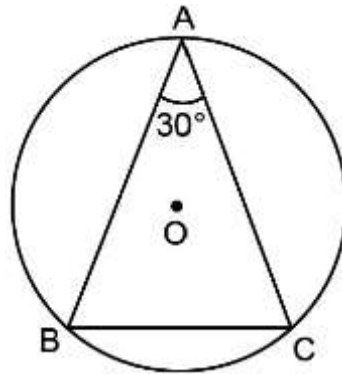
29. How much paper of each shade is needed to make a kite given in figure, in which ABCD is a square with diagonal 44 cm?
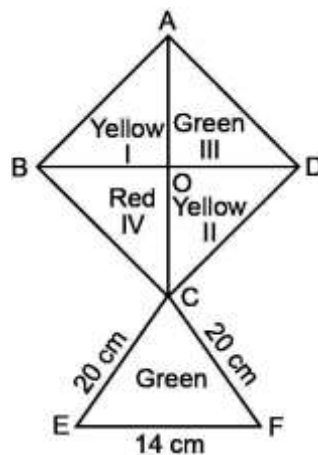
30. If a transversal intersects two lines such that the bisectors of a pair of corresponding angles are parallel, then prove that the two lines are parallel.

OR

In the below figure, the sides AB and AC of ΔABC are produced to points E and D respectively. If bisectors BO and CO of ∠ CBE and ∠ BCD respectively meet at point O, then prove that ∠BOC = 90° − ∠BAC.
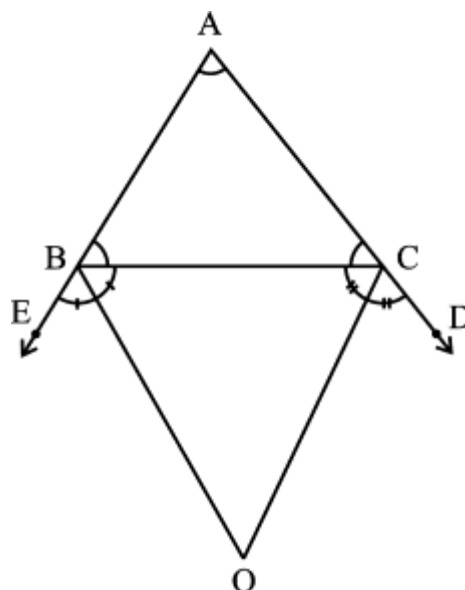
31. If $z^2 + \dfrac{1}{z^2} = 34$, find the value of $z^3 + \dfrac{1}{z^3}$ using only the positive value of $z + \dfrac{1}{z}$.

32. ABCD is a rectangle in which diagonal AC bisects $\angle$ A and $\angle$ C. Prove that ABCD is square.

33. On a square plot of land, a farmer wants to grow five different crops at a time. On half area, he wants to grow wheat. But in rest four equal parts, he wants to grow four different crops. How can he divide the area, suggest diagrammatically and give justification?

34. 1500 families with 2 children were selected randomly and the following data were recorded:

No. of girls in family	2	1	0
No. of families	475	814	211

Compute the probability having (a) Two girls (b) One girl (c) No girl

OR

A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be (i) red ? (ii) white ? (iii) not green?

SECTION – D
Questions 35 to 40 carry 4 marks each.

35. If $x = \dfrac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ and $y = \dfrac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$, then find the value of $x^2 + y^2 - 5xy$.

OR

Prove that $\dfrac{1}{3-\sqrt{8}} - \dfrac{1}{\sqrt{8}-\sqrt{7}} + \dfrac{1}{\sqrt{7}-\sqrt{6}} - \dfrac{1}{\sqrt{6}-\sqrt{5}} + \dfrac{1}{\sqrt{5}-2} = 5$

36. A co-operative house adopted a triangular park PQR to maintain its greenary of dimensions QR = 7m, Q = 75° and PQ + PR = 13m, Make a PQR using cm instead of m.

37. Water is flowing into a water tank at the rate of 20 cubic cm/sec. If the volume of water collected in x seconds is y cubic cm.
(a) Write a linear equation and draw its graph.
(b) Write the volume of water after 5 seconds.

38. The patients in a hospital are given soup daily in a cylindrical bowl of diameter 7cm. On a particular day, the girls of KANYAMAHAVIDYALAYA decided to cook the soup for the patients. If they fill the bowl with soup to a height of 5cm then how much soup is to be cooked for 300 patients?

OR

The resident of society decided to paint the hall of cancer detective centre in their premises. If the floor of the cuboidal hall has a perimeter equal to 250 m and height 6m then
(a) Find the cost of painting its four walls (including doors etc) at the rate of Rs. 8 per m^2.
(b) What is the amount contributed by 50 people?

39. Diagonal AC and BD of quadrilateral ABCD intersects each other at O. Prove that
(i) AB + BC + CD + DA > AC + BD
(ii) AB + BC + CD + DA < 2 (AC + BD)

OR

Prove that two right triangles are congruent, if the hypotenuse and a side of one triangle are respectively equal to the hypotenuse and a side of the other triangle.

40. The table given below shows the frequency distribution of the scores obtained by 200 candidates in a BCA entrance examination:

Scores	Number of Candidates
200 - 250	30
250 - 300	15
300 - 350	45
350 - 400	20
400 - 450	25
450 - 500	40
500 - 550	10
550 - 600	15

(i) Determine the class limit of third class interval.
(ii) Determine the class size.
(iii) Determine the class marks of sixth class interval.
(iv) How many candidates are in the range of score 350 to 600?

CLASS X

SAMPLE PAPER TEST 01 (2019-20)

SUBJECT:MATHEMATICS   MAX. MARKS :80

CLASS : X   **DURATION : 3 HRS**

General Instruction:

(i) All the questions are compulsory.

(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.

(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.

(iv) There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

(v) Use of calculators is not permitted.

SECTION – A

Questions 1 to 20 carry 1 mark each.

1. For some integers p and 5, there exist unique integers q and r such that $p = 5q + r$. Possible values of r are

(a) 0 or 1   (b) 0, 1 or 2   (c) 0, 1, 2 or 3   (d) 0, 1, 2, 3 or 4

2. If two positive integers p and q can be expressed as $p = ab^2$ and $q = a^3b$; where a, b being prime numbers, then LCM (p, q) is equal to

(a) ab   (b) a^2b^2 (c) a^3b^2 (d) a^2b^3

3. The pair of linear equations $2x + 3y = 5$ and $4x + 6y = 10$ is

(a) inconsistent   (b) consistent (c) dependent consistent   (d) none of these

4. The points $(-4, 0)$, $(4, 0)$ and $(0, 3)$ are the vertices of a/an

(a) right triangle   (b) isosceles triangle (c) equilateral triangle   (d) scalene triangle

5. The perimeter of a triangle with vertices $(0, 4)$, $(0, 0)$ and $(3, 0)$ is (a) 5   (b) 12   (c) 11   (d) $7 + \sqrt{5}$

6. If P $\left(\dfrac{a}{3}, 4\right)$ is the mid-point of the line segment joining the points Q $(-6, 5)$ and R $(-2, 3)$, then the value of a is

(a) -4 (b) -12 (c) 12   (d) -6

7. In $\triangle ABC$, right angled at B, AB = 5 cm and $\sin C = 1/2$. Determine the length of side AC.

(a) 10 cm   (b) 15 cm   (c) 20 cm   (d) none of these

8. If $\sin \theta = \cos \theta$, find the value of θ.

(a) 30°   (b) 45°   (c) 60°   (d) none of these

9. If sec A = 15/7 and A + B = 90°, find the value of cosec B.

(a) 8/7   (b) 12/7   (c) 7/15   (d) 15/7

10. The median class of the following data is:

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
No. of students	8	10	12	22	30	18

(a) 20 – 30   (b) 30 – 40   (c) 40 – 50   (d) 50 – 60

11. The ratio of the volumes of a cylinder, a cone and a sphere, if each has the same diameter and same height is_____

12. Zeroes of $p(z) = z^2 - 27$ are _____ and_____.

OR

If $x = 2$ is a solution of the equation $x^2 - 5x + 6k = 0$, the value of k is_____.

13. If $p - 1$, $p + 3$, $3p - 1$ are in AP, then p is equal to_____.

14. From a well shuffled pack of cards, a card is drawn at random. The probability of getting a black queen is _ _

15. In the given below left figure, MN ∥ QR and PM = 3 cm, MQ = 4 cm, PN = 6 cm, PR = x cm, then x = _____.
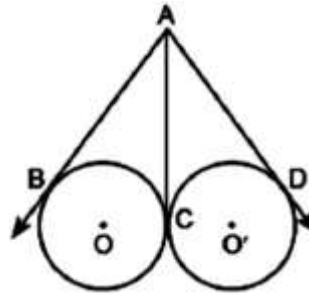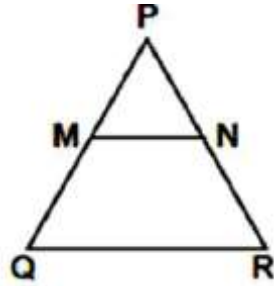
16. In the given above right sided figure, AB, AC and AD are tangents. If AB = 5 cm, find AD.

OR

A point P is 26 cm from the centre of the circle. The length of the tangent drawn from P to the circle is 24 cm. Find the radius of the circle.

17. A vertical stick 12 m long casts a shadow 8 m long on the ground. At the same time a tower casts the shadow 40 m long on the ground. Determine the height of the tower.

18. Find the nature of roots of the quadratic equation $9x^2 - 6x - 2 = 0$.

19. The HCF of two numbers is 145 and their LCM is 2175. If one number is 725, then find the other number.

20. Which term of the AP 21, 42, 63, 84, ... is 420?

SECTION – B

Questions 21 to 26 carry 2 marks each.

21. A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be (i) red ? (ii) not green?

OR

A lot consists of 144 ball pens of which 20 are defective and the others are good. Nuri will buy a pen if it is good, but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the probability that (i) She will buy it ? (ii) She will not buy it ?

22. ABCD is a trapezium in which AB ∥ DC and its diagonals intersect each other at the point O.
Show that $\dfrac{AO}{BO} = \dfrac{CO}{DO}$

OR

A girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds.

23. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that $AB + CD = AD + BC$

24. The decorative block shown in below left figure is made of two solids — a cube and a hemisphere. The base of the block is a cube with edge 5 cm, and the hemisphere fixed on the top has a diameter of 4.2 cm. Find the total surface area of the block.
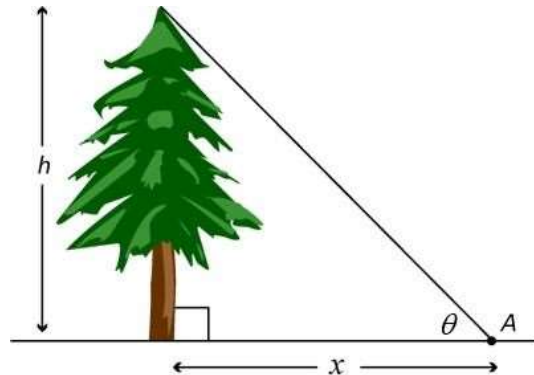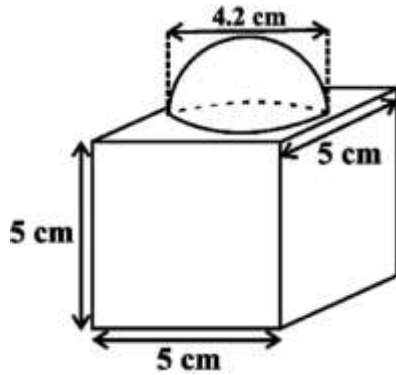
25. Karan is standing at some distance from a tree(see above right sided figure). The height of the tree is 100 m. If the Karan measure the angle of elevation to the top of the tree to be θ, such that sin θ = 1/2, find at what distance Karan is standing?

26. If the sum of the first 14 terms of an AP is 1050 and its first term is 10, find the 20th term.

SECTION – C
Questions 27 to 34 carry 3 marks each.

27. Prove that $\sqrt{5}$ is an irrational number.

OR

Use Euclid's division algorithm to find the HCF of 504 and 980.

28. Four friends Ram, Mohan, Ajay and Sanjay are playing in a rectangular playground. Ram suggested his friends to get the position by keeping a stone in the middle of the park and he told the stone is the origin for their position. Now, they got the position of all four friends as (− 4, − 2), (− 3, − 5), (3, − 2) and (2, 3). Mohan claimed that their position will form a quadrilateral if taken in order. Ajay and Sanjay are now trying to calculate the area of the quadrilateral formed by their position if taken in order. How much area they calculated.

29. Prove that $\dfrac{\sin\square-\cos\square+1}{\sin\square+\cos\square-1} = \sec\square+\tan\square$

OR

If $\sin (A - B) = \dfrac{1}{2}$, $\cos (A + B) = \dfrac{1}{2}$, $0° < A + B \le 90°$, A > B, find A and B.

30. Find the area of the shaded design in below figure, where ABCD is a square of side 10 cm and semicircles are drawn with each side of the square as diameter. (Use π = 3.14)
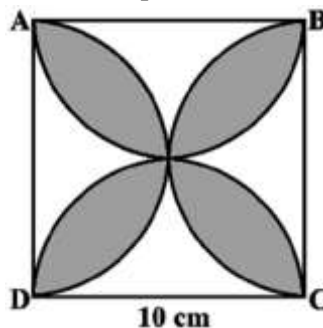
31. The sum of the third and the seventh terms of an AP is 6 and their product is 8. Find the sum of first sixteen terms of the AP.

32. On dividing $x^3 - 3x^2 + x + 2$ by a polynomial g(x), the quotient and remainder were x − 2 and −2x + 4, respectively. Find g(x).

33. Draw the graphs of the equations x – y + 1 = 0 and 3x + 2y – 12 = 0. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region.

OR

The sum of the digits of a two-digit number is 9. Also, nine times this number is twice the number obtained by reversing the order of the digits. Find the number.

34. One day school students along with a teacher visited a hospital to find the number of patients and after collecting the data, they prepared the frequency distribution table for the same. A teacher asked students to calculate the mean age of all the patients. Find the mean age of the patients from the following distribution:

Age(in years)	5-14	15-24	25-34	35-44	45-54	55-64
No. of patients	6	11	21	23	14	5

SECTION – D
Questions 35 to 40 carry 4 marks each.

35. Prove that "The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides."

36. A farmer connects a pipe of internal diameter 20 cm from a canal into a cylindrical tank in her field, which is 10 m in diameter and 2 m deep. If water flows through the pipe at the rate of 3 km/h, in how much time will the tank be filled?

OR

A solid consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm.

37. As observed from the top of a 75 m high lighthouse from the sea-level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships.

38. Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours

less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

OR

A rectangular park is to be designed whose breadth is 3 m less than its length. Its area is to be 4 square metres more than the area of a park that has already been made in the shape of an isosceles triangle with its base as the breadth of the rectangular park and of altitude 12 m. Find its length and breadth.

39. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and $\angle$ ABC = 60°. Then construct a triangle whose sides are 3/4 of the corresponding sides of the triangle ABC.

OR

Draw a circle of radius 4 cm. Construct a pair of tangents to it, the angle between which is 60°.

40. The table given below shows the frequency distribution of the cores obtained by 200 candidates in a BCA examination.

Score	200-250	250-300	300-350	350-400	400-450	450-500	500-550	550-600
No. of students	30	15	45	20	25	40	10	15

Draw cumulative frequency curves by using (i) less than type and (ii) more than type. Hence find median

SUBJECT: MATHEMATICS   **MAX. MARKS : 80**
CLASS : X   **DURATION : 3 HRS**

~~General Instruction:~~

(i) All the questions are compulsory.
(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.
(iv) There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
(v) Use of calculators is not permitted.

SECTION – A
Questions 1 to 20 carry 1 mark each.

1. The ratio between the LCM and HCF of 5, 15, 20 is:
(a) 9 : 1   (b) 4 : 3   (c) 11 : 1   (d) 12 : 1

2. HCF of $5^2 \times 3^2$ and $3^5 \times 5^3$ is:
(a) $5^3 \times 3^5$ (b) 5×3^3 (c) $5^3 \times 3^2$ (d) $5^2 \times 3^2$

3. A pair of linear equations which has a unique solution x = 2, y = –3 is
(a) x + y = –1; 2x – 3y = –5
(b) 2x + 5y = –11; 4x + 10y = –22
(c) 2x – y = 1 ; 3x + 2y = 0
(d) x – 4y – 14 = 0; 5x – y – 13 = 0

4. If tan θ = cot (30° + θ), find the value of θ.
(a) 30°   (b) 45°   (c) 60°   (d) none of these

5. If tan A = 5/12, find the value of (sin A + cos A) . sec A.
(a) 12/5   (b) 17/12   (c) 7/12   (d) none of these

6. If sin θ = 1/3, then find the value of $(2 \cot^2 \theta + 2)$
(a) 5   (b) 12   (c) 9   (d) 18

7. The upper limit of modal class of the data given below is

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
No. of students	9	11	10	8	8	3

(a) 10   (b) 20   (c) 30   (d) 40

8. A circle drawn with origin as the centre passes through $\left(\frac{13}{2}, 0\right)$. The point which does not lie in the interior of the circle is (a) $\left(-\frac{3}{4}, 1\right)$ (b) $\left(2, \frac{7}{3}\right)$ (c) $\left(5, -\frac{1}{2}\right)$ (d) $\left(-6, \frac{5}{2}\right)$

9. If the distance between the points (4, p) and (1, 0) is 5 units, then the value of p is
(a) 4 only   (b) ± 4   (c) –4 only   (d) 0

10. AOBC is a rectangle whose three vertices are A(0, 3), O(0, 0) and B(5, 0). The length of its diagonal is
(a) 5   (b) 3   (c) $\sqrt{34}$ (d) 4

11. 7th term of an AP is 40. The sum of its first 13th terms is_____.

12. If the product of the zeroes of $x^2 - 3kx + 2k^2 - 1$ is 7, then values of k are _____ and _____ .

OR

If the roots of the equation $12x^2 + mx + 5 = 0$ are in the ratio 3 : 2, then m equals _____ .

13. Two cylindrical cans have equal base areas. If one of the can is 15 cm high and other is 20 cm high, then the ratio of their volumes is _____

14. Two coins are tossed simultaneously, then the probability of getting exactly one head is _____

15. $\Delta ABC \sim \Delta PQR$. Area of $\Delta ABC = 81$ cm^2 and area of $\Delta PQR = 121$ cm^2. If altitude AD = 9 cm, then PM = _____ .
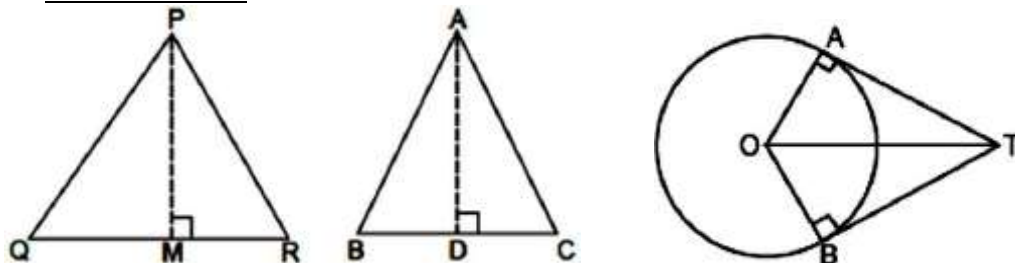
16. In the above right sided figure if $\angle ATO = 40°$, find $\angle AOB$.

OR

From a point P, the length of the tangent to a circle is 15 cm and distance of P from the centre of the circle is 17 cm. Then what is the radius of the circle?

17. If $\dfrac{p}{q}$ is a rational number ($q \neq 0$), what is condition of q so that the decimal representation of is terminating ?

18. The lengths of the diagonals of a rhombus are 30 cm and 40 cm. Find the side of the rhombus.

19. If $ax^2 + bx + c = 0$ has equal roots, what is the value of c?

20. For what value of p, are $2p + 1$, 13, $5p - 3$ three consecutive terms of an AP?

SECTION – B

Questions 21 to 26 carry 2 marks each.

21. O is any point inside a rectangle ABCD (see below left figure). Prove that $OB^2 + OD^2 = OA^2 + OC^2$.

OR
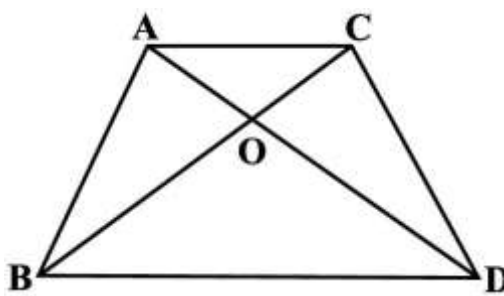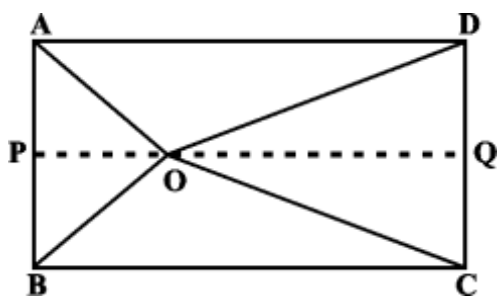
In the above right sided figure, ABC and DBC are two triangles on the same base BC. If AD intersects BC at O, show that $\dfrac{ar(\Delta ABC)}{ar(\Delta DBC)} = \dfrac{AO}{DO}$

22. Find the 20th term from the last term of the AP : 4, 9 , 14, . . ., 254.

23. A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be (i) red ? (ii) green or white ?

OR

Cards numbered 1, 2, 3, ..., 16 are put in a box and mixed thoroughly. A card is drawn at random from the box. Find the probability that the card drawn bears (i) an even number (ii) a perfect square number.

24. Mayank made a bird-bath for his garden in the shape of a cylinder with a hemispherical depression at one end (see the below figure). The height of the cylinder is 1.45 m and its radius is 30 cm. Find the toal surface area of the bird-bath.
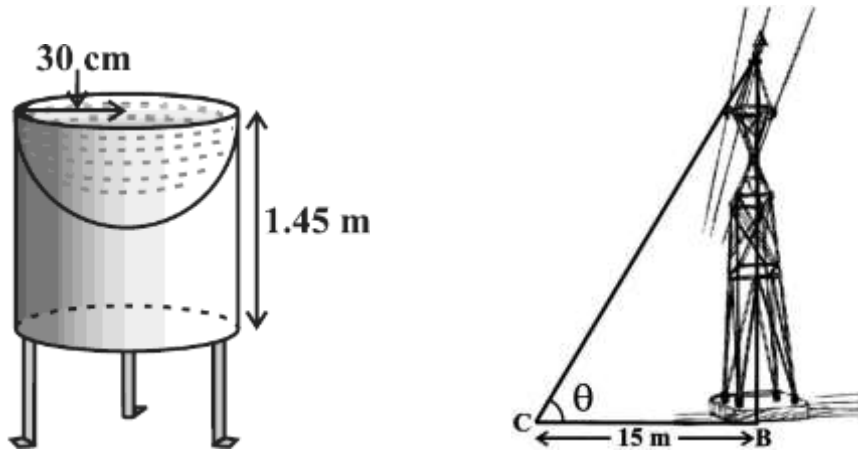
25. Rahul went to excursion along with his friends. He saw a tower stands vertically on the ground(see above right sided figure). He observes that from a point on the ground, which is 15 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be θ such that cosθ = 0.5. Find the height of the tower.

26. Prove that "The lengths of the two tangents from an external point to a circle are equal."

SECTION – C
Questions 27 to 34 carry 3 marks each.

27. Prove that $\sqrt{5}$ is an irrational number.

OR

Find HCF and LCM of 625, 1125 and 2125 using fundamental theorem of arithmetic.

28. In the given figure ABCD is a square of side 14 cm. Find the area of the shaded region.
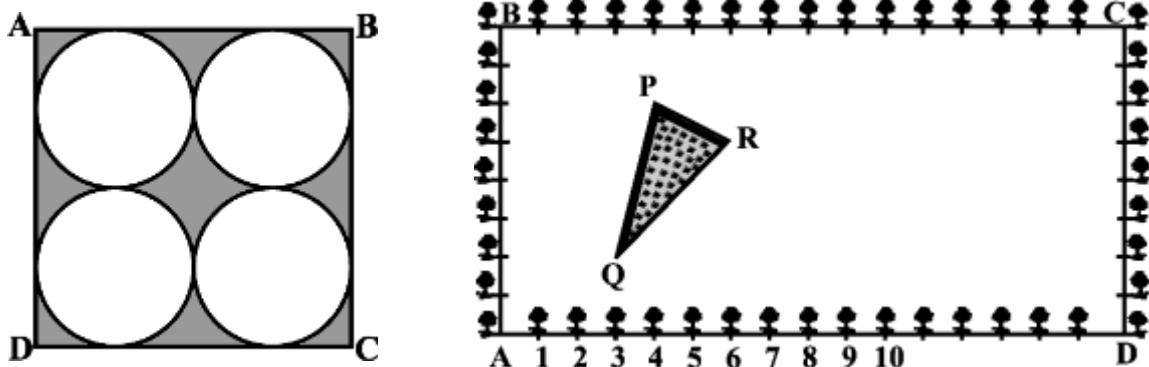
29. The Class X students of a secondary school in Krishinagar have been allotted a rectangular plot of land for their gardening activity. Sapling of Gulmohar are planted on the boundary at a distance of 1m from each other. There is a triangular grassy lawn in the plot as shown in the above right sided figure. The students are to sow seeds of flowering plants on the remaining area of the plot. Taking A as origin, find the area of the triangle PQR.

30. Prove that $\dfrac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \cos ec A + \cot A$.

OR

If tan (A + B) = $\sqrt{3}$ and tan (A – B) = $\dfrac{1}{\sqrt{3}}$; 0° < A + B ≤ 90°; A > B, find A and B.

31. If the sum of first seven terms of an AP is 49 and that of seventeen terms is 289. Find the sum of first n terms.

32. If two zeroes of the polynomial $2x^4 - 3x^3 - 3x^2 + 6x - 2$ are $\sqrt{2}$ and $-\sqrt{2}$, find the other zeroes of the polynomial.

33. Solve the following pair of linear equations: 152x – 378y = – 74 and –378x + 152y = – 604

OR

Draw the graphs of the equations 5x – y = 5 and 3x – y = 3. Determine the co-ordinates of the vertices of the triangle formed by these lines and the y axis.

34. The following data gives the information on the observed lifetimes (in hours) of 225 electrical components :

Lifetimes (in hours)	0 – 20	20 – 40	40 – 60	60 – 80	80 –100	100 – 120
Frequency	10	35	52	61	38	29

Determine the modal lifetimes of the components.

SECTION – D
Questions 35 to 40 carry 4 marks each.

35. A highway leads to the foot of 300 m high tower. An observatory is set at the top of the tower. It sees a car moving towards it at an angle of depression of 30°. After 15 seconds angle of depression becomes 60°. Find the distance travelled by the car during this time.

36. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

OR

A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

37. Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

38. Construct a triangle of sides 5 cm, 6 cm, 7 cm and then a triangle similar to it whose sides are 7/5 of the corresponding sides of the first triangle, also write the steps of construction.

OR

Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Draw tangents to the circle from these two points P and Q.

39. A container, opened from the top and made up of a metal sheet, is in the form of a frustum of a cone of height 16 cm with radii of its lower & upper ends as 8 cm and 20 cm, respectively. Find the cost of the milk which can completely fill the container, at the rate of Rs 20 per litre. Also find the cost of metal sheet used to make the container, if it costs Rs 8 per 100 cm^2.(Use π=3.14)

OR

Water in a canal, 6 m wide and 1.5 m deep, is flowing with a speed of 10 km/h. How much area will it irrigate in 30 minutes, if 8 cm of standing water is needed?

40. The following distribution gives the daily income of 50 workers of a factory.

Daily income (in Rs)	100 – 120	120 – 140	140 – 160	160 – 180	180 – 200
Number of workers	12	14	8	6	10

Convert the distribution above to a less than type cumulative frequency distribution, and draw its ogive.

▪▪

SAMPLE PAPER TEST 03 (2019-20)

SUBJECT: MATHEMATICS   MAX. MARKS : 80

CLASS : X   **DURATION : 3 HRS**

~~General Instruction:~~

(i) All the questions are compulsory.

(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.

(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.

(iv) There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

(v) Use of calculators is not permitted.

SECTION – A
Questions 1 to 20 carry 1 mark each.

1. Two alarm clocks ring their alarms at regular intervals of 50 seconds and 48 seconds. If they first beep together at 12 noon, at what time will they beep again for the first time?
   (a) 12.20 pm   (b) 12.12 pm   (c) 12.11 pm   (d) none of these

2. The decimal expansion of the rational number 14587/1250 will terminate after
   (a) one decimal place   (b) two decimal places   (c) three decimal places (d) four decimal places

3. If x = a, y = b is the solution of the pair of equations x – y = 2 and x + y = 4, then the respective values of a and b are
   (a) 3, 5   (b) 5, 3   (c) 3, 1   (d) –1, –3

4. If P(1, 2), Q(4, 6), R(5, 7) and S(a, b) are the vertices of a parallelogram PQRS, then
   (a) a = 2, b = 4   (b) a = 3, b = 4   (c) a = 2, b = 3   (d) a = 3, b = 5

5. The modal class for the following distribution is

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60
No. of students	3	12	27	57	75	80

   (a) 20 – 30   (b) 30 – 40   (c) 40 – 50   (d) 50 – 60

6. If cot θ = 7/8, evaluate $\dfrac{(1+\sin\square)(1-\sin\square)}{(1+\cos\square)(1-\cos\square)}$
   (a) 7/8   (b) 64/49   (c) 49/64   (d) none of these

7. If cos θ = 1/3, then find the value of $(2 \cot^2 \theta + 2)$
   (a) 18   (b) 12   (c) 9   (d) none of these

8. In the below left figure, AD = 4 cm, BD = 3 cm and CB = 12 cm, find cot θ.
   (a) 12/5   (b) 17/12   (c) 7/12   (d) none of these
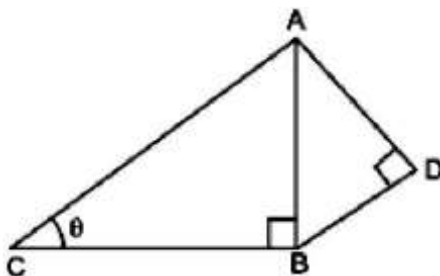

9. If A and B are the points (–6, 7) and (–1, –5) respectively then find the distance 2AB.
   (a) 18   (b) 26   (c) 13   (d) none of these

10. A straight line is drawn joining the points (3, 4) and (5, 6). If the line is extended, the ordinate of the point on the line, whose abscissa is –1 is_____.
(a) 1   (b) -1   (c) 0   (d) none of these

11. A cylinder and a cone are of same base radius and of same height. The ratio of the volume of cylinder to that of the cone is_____.

12. 7th term of an AP is 40. The sum of its first 13th terms is_____.

13. If the roots of the equation $12x^2 + mx + 5 = 0$ are in the ratio 3 : 2, then m equals_____.

OR

If zeroes of $p(x) = 2x^2 – 7x + k$ are reciprocal of each other, then value of k is_____.

14. Two coins are tossed simultaneously, then the probability of getting exactly one head is _____

15. In the below left figure, if ΔABC ~ ΔPQR. The value of x is_____.
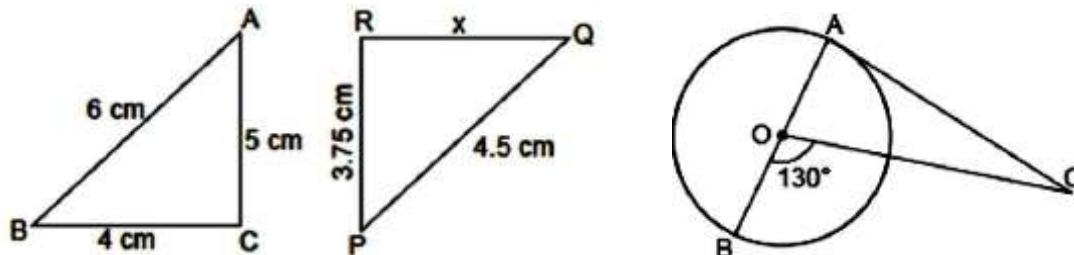
16. The two tangents from an external point P to a circle with centre O are PA and PB. If APB = 70°, what is the value of AOB?

OR

In the above right sided figure, AOB is a diameter of a circle with centre O and AC is a tangent to the circle at A. If BOC = 130°, then find ACO.

17. If the areas of two similar triangles are in ratio 25 : 64, write the ratio of their corresponding sides.

18. The HCF and LCM of two numbers are 9 and 360 respectively. If one number is 45, write the other number.

19. If the sum of first m terms of an AP is $2m^2 + 3m$, then what is its second term?

20. For what value of k, are the roots of the quadratic equation $3x^2 + 2kx + 27 = 0$ real and equal.

SECTION – B
Questions 21 to 26 carry 2 marks each.

21. A bag contains 5 white balls, 7 red balls, 4 black balls and 2 blue balls. A ball is drawn at random from the bag. Find the probability that the drawn ball is (i) white or blue, (ii) neither white nor black.

OR

A number is selected at random from the first 50 natural numbers. Find the probability that it is a multiple of 3 and 4.

22. The first and the last terms of an A.P. are 17 and 350 respectively. If its common difference is 9, find the number of terms in the A.P. and find their sum.

23. If AD and PM are medians of ΔABC and ΔPQR respectively where ΔABC ~ ΔPQR, prove that $\dfrac{AB}{PQ} = \dfrac{AD}{PM}$.

OR

Prove that the sum of the squares of the sides of a rhombus is equal to sum of the squares of its diagonals.

24. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

25. The origins of the fez, called the "tarboosh" by the Moroccans, are in dispute. Some claim that its origins are ancient Greece; others claim it comes from the Balkans. The name "fez" comes from Moroccan city of the same name. Fez, Morocco produced the dye, made from crimson berries, to colour the hat. A fez, the cap used by the Turks, is shaped like the frustum of a cone (see the below left figure). If its radius on the open side is 10 cm, radius at the upper base is 4 cm and its slant height is 15 cm, find the area of material used for making it.
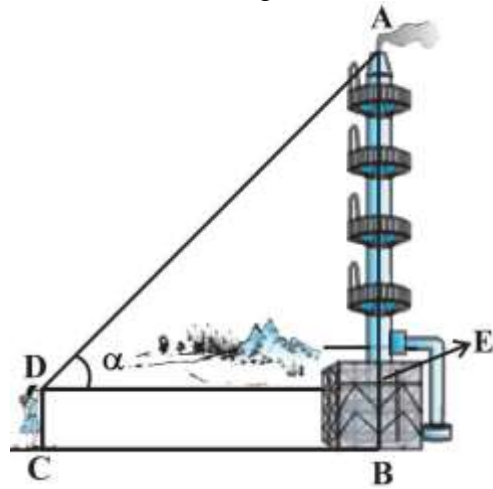
26. An observer 1.5 m tall is 28.5 m away from a chimney (see above right sided figure). The angle of elevation of the top of the chimney from her eyes is α such that $\cos 2\alpha = \sin(45^0 - \alpha)$. What is the height of the chimney?

<h1 style="text-align:center">SECTION – C</h1>

Questions 27 to 34 carry 3 marks each.

27. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find (i) the length of the arc and (ii) area of sector formed by the arc.

28. In a classroom, three friends are seated at the points A, B and C as shown in below left figure. Champa and Chameli walk into the class and after observing for a few minutes Champa asks Chameli, "Don't you think ABC forms a triangle?" Chameli agrees. Both are trying to calculate the area of the triangle ABC formed. Find the coordinates and how much area they calculated.
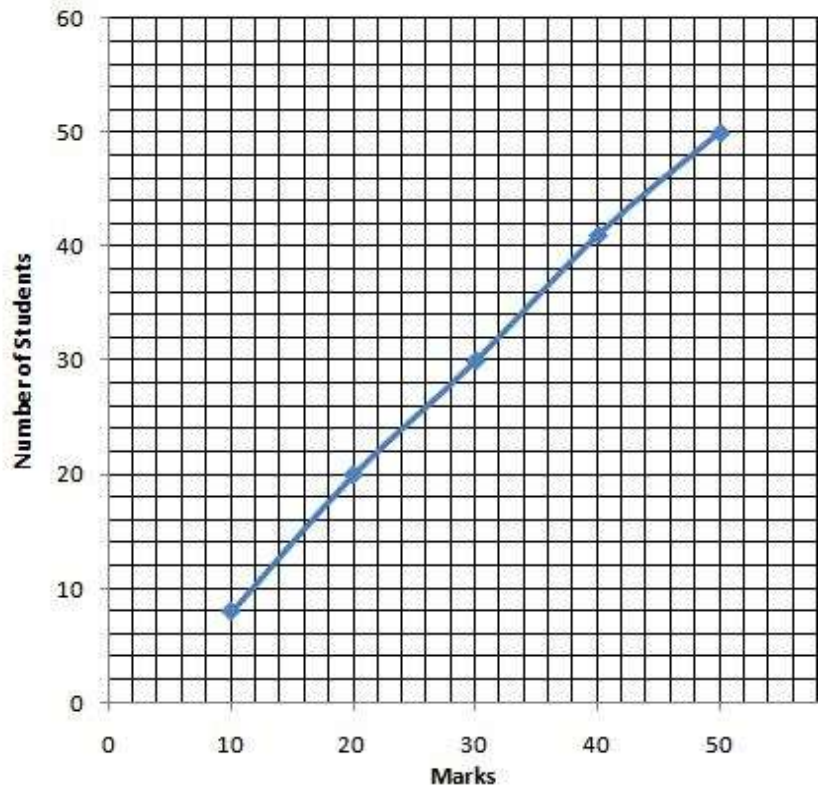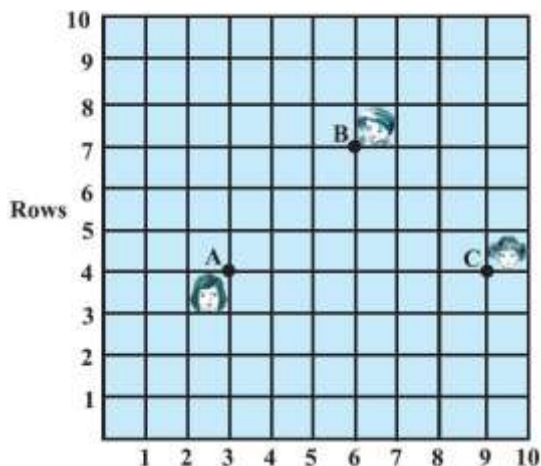
29. A teacher asks the student to collect the marks of the students in Maths Periodic Test out of 50 marks. A student collected the marks and prepares the frequency distribution table as per the instructions of the teacher. From the frequency table, again student prepare less than cf distribution and then he draws less than ogive as shown in above right sided figure. Construct the frequency distribution table using the less than ogive and then find the median marks

30. Show that any positive even integer is of the form 4q or 4q + 2, where q is some integer.

OR

If the HCF of 65 and 117 can be written as (65 m – 117), find the value of m.

31. A number consists of two digits whose sum is 9. If 27 is added to the number, the digits change their places. Find the number. **OR**

Solve the following pair of linear equations: $6x + 3y = 6xy$ and $2x + 4y = 5xy$

32. If two zeroes of the polynomial $x^4 - 6x^3 - 26x^2 + 138x - 35$ are $2 \pm \sqrt{3}$, find other zeroes.

33. Prove that: $\dfrac{\sin \square}{1+\cos \square} + \dfrac{1+\cos \square}{\sin \square} = 2 \cos ec \square$

OR

If $\cos A + \sin A = \sqrt{2} \cos A$, show that $\cos A - \sin A = \sqrt{2} \sin A$.

34. Find three numbers in A.P. whose sum is 15 and whose product is 105.

SECTION – D
Questions 35 to 40 carry 4 marks each.

35. Two pipes together can fill a tank in 12 hours. If first pipe can fill the tank 10 hours faster than the second, then how many hours will the second pipe take to fill the tank?

OR

Solve for x : $\dfrac{1}{x+1} + \dfrac{2}{x+2} = \dfrac{4}{x+4}, x \neq -1, -2, -4$

36. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio.

37. Construct a right angled $\triangle ABC$, whose sides (other than hypotenuse) are 4 cm and 3 cm. Then construct a triangle whose sides are 5/3 of the corresponding sides of $\triangle ABC$.

OR

Construct a tangent to a circle of radius 4 cm from a point on the concentric circle of radius 6 cm and measure its length.

38. On a horizontal plane there is a vertical tower with a flag pole on the top of the tower. From a point 9 m away from the foot of the tower, the angles of elevation of the top and foot of the flag pole are 60° and 30° respectively. Find the heights of the tower and the flag pole mounted on it.

39. Four circular cylindrical vessels, each having a diameter 21 cm and height 38 cm are full of ice- cream. This ice-cream is to be filled in cones each of height 12 cm and diameter 7 cm, having a hemispherical shape on the top. Find the total number of cones that can be filled with the ice- cream.   **OR**

A milkman uses a container, in the shape of frustum of a cone, to store milk. The container open from the top, is of height 40 cm with radii of its lower and upper circular ends as 14 cm and 35 cm respectively. Find the volume of milk (in litres) which can completely fill the container. If he sells the milk at Rs. 35 per litre, for how much amount he can sell the whole milk ?

40. The mean of the following frequency distribution is 62.8 and the sum of all frequencies is 50. Find the missing frequencies f_1 and f_2.

Class	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100	100 – 120
Frequency	5	f_1	10	f_2	7	8

SAMPLE PAPER TEST 04 (STANDARD) (2019-20)

SUBJECT: MATHEMATICS   MAX. MARKS : 80

CLASS : X   **DURATION : 3 HRS**

~~General Instruction:~~

(i) All the questions are compulsory.

(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.

(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.

(iv) There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

(v) Use of calculators is not permitted.

SECTION – A

Questions 1 to 20 carry 1 mark each.

1. The points (–4, 0), (4, 0), (0, 3) are the vertices of a
   (a) right triangle   (b) isosceles triangle (c) equilateral triangle (d) scalene triangle

2. The point which divides the line segment joining the points (7, –6) and (3, 4) in ratio 1 : 2 internally lies in the
   (a) I quadrant   (b) II quadrant   (c) III quadrant   (d) IV quadrant

3. The value of the expression [cosec $(75° + \theta)$ – sec $(15° – \theta)$ – tan $(55° + \theta)$ + cot $(35° – \theta)$] is
   (a) – 1   (b) 0   (c) 1   (d) $\dfrac{3}{2}$

4. The value of (tan1° tan2° tan3° ... tan89°) is
   (a) 0   (b) 1   (c) 2   (d) $\dfrac{1}{2}$

5. If cos 9α = sinα and $9\alpha < 90°$, then the value of tan5α is
   (a) $\dfrac{1}{\sqrt{3}}$ (b) $\sqrt{3}$ (c)1   (d) 0

6. Let x = $\dfrac{7}{20 \times 25}$ be a rational number. Then x has decimal expansion, which terminates:
   (a) after four places of decimal   (b) after three places of decimal
   (c) after two places of decimal   (d) after five places of decimal

7. On dividing a positive integer n by 9, we get 7 as a remainder. What will be the remainder if (3n – 1) is divided by 9?
   (a) 1   (b) 2   (c) 3   (d) 4

8. If the pair of equations 2x + 3y = 7 and kx + $\dfrac{9}{2}$ y = 12 have no solution, then the value of k is:
   (a) $\dfrac{2}{3}$ (b) – 3   (c) 3   (d) $\dfrac{3}{2}$

9. If P $\left[\dfrac{a}{3}, 4 \right]$ is the mid-point of the line segment joining the points Q (– 6, 5) and R (– 2, 3), then the value of a is
   (a) – 4   (b) – 12   (c) 12   (d) – 6

10. For the following distribution :

Class	0-5	5-10	10-15	15-20	20-25
Frequency	10	15	12	20	9

the sum of lower limits of the median class and modal class is

(a) 15   (b) 25   (c) 30   (d) 35

11. If one of the zeroes of the cubic polynomial $x^3 + ax^2 + bx + c$ is -1, then the product of the other two zeroes is _____

OR

If 1 is a root of the equation $x^2 + kx - \dfrac{5}{4} = 0$, then the value of k is _____

12. The 10th term of the AP: 5, 8, 11, 14, ... is _____

13. The perimeters of two similar triangles ΔABC and ΔPQR are 35cm and 45cm respectively, then the ratio of the areas of the two triangles is_____

14. If the probability of an event is p, the probability of its complementary event will be _____

15. A shuttle cock used for playing badminton has the shape of the combination of _____

16. If the angle between two tangents drawn from an external point 'P' to a circle of radius 'r' and centre O is 60^0, then find the length of OP.

OR

If the radii of two concentric circles are 4 cm and 5 cm, then find the length of each chord of one circle which is tangent to the other circle.

17. If adjoining figure, DE || BC and AD = 1 cm, BD = 2 cm. What is the ratio of the area of Δ ABC to the area of Δ ADE?
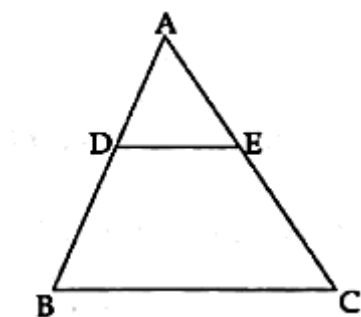
18. Does the rational number $\dfrac{441}{2^2.5^7.7^2}$ has a terminating or a non-terminating decimal representation?

19. Write the nature of roots of the quadratic equation $9x^2 - 6x - 2 = 0$.

20. The nth term of an AP is $7 - 4n$. Find its common difference.

## SECTION – B
Questions 21 to 26 carry 2 marks each.

21. Cards marked with all 2-digit numbers are placed in a box and are mixed thoroughly. One card is drawn at random. Find the probability that the number on the card is (i) divisible by 10 (ii) a perfect square number.

OR

The king, queen and jack of clubs are removed from a deck of 52 playing cards and the remaining cards are shuffled. A card is drawn from the remaining cards. Find the probability of getting a card of (i) hearts (ii) queen.

22. A drinking glass is in the shape of a frustum of a cone of height 14 cm. The diameters of its two circular ends are 4 cm and 2 cm. Find the capacity of the glass.

23. A passenger is travelling in an airplane. An airplane is flying at a height of 3000 m above the level ground. He observes that the angle of depression from the plane to the foot of a tree is α, such that $\cos 3\alpha = \sin(120^0 - 4\alpha)$. Find the distance that the airplane must fly to be directly above the tree.
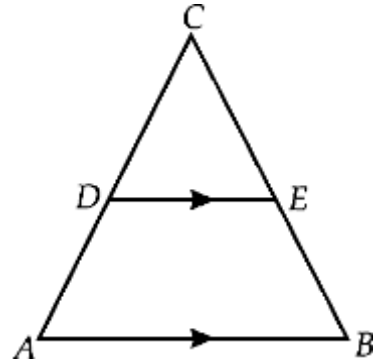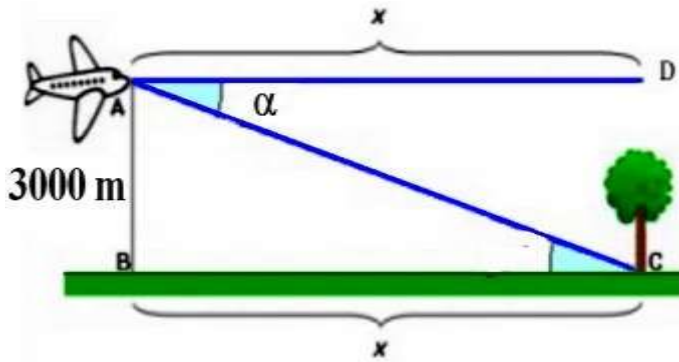
24. In the above right sided figure, $\angle A = \angle B$ and $AD = BE$. Show that $DE \parallel AB$

OR

In the rectangle ABCD, E is a point on AB such that $AE = \dfrac{2}{3} AB$. If AB = 6 km and AD = 3 km, then find DE.

25. In an AP, the sum of first n terms is $\dfrac{5n^2}{2} + \dfrac{3n}{2}$. Find its 20th term.

26. Prove that "The tangent to a circle is perpendicular to the radius through the point of contact".
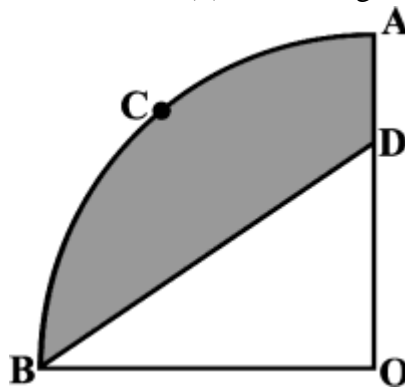
SECTION – C
Questions 13 to 22 carry 3 marks each.

27. Prove that $\sqrt{5}$ is an irrational number.

OR

Use Euclid's division algorithm to find the HCF of 504 and 980.

28. In the below figure, OACB is a quadrant of a circle with centre O and radius 3.5 cm. If OD = 2 cm, find the area of the (i) quadrant OACB, (ii) shaded region.

29. If A, B and C are interior angles of a triangle ABC, then show that $\tan\left(\dfrac{A+B}{2}\right) = \cot\dfrac{C}{2}$

OR

Prove that $\dfrac{\sin A + \cos A}{\sin A - \cos A} + \dfrac{\sin A - \cos A}{\sin A + \cos A} = \dfrac{2}{2\sin^2 A - 1}$.

30. Four friends A, B, C and D are playing in a rectangular park. They are trying to find the coordinates by taking origin in the middle of the park such that their positions in order will form a parallelogram ABCD. They are able to find the coordinates of A(3, –4), B(–1, –3) and C(–6, 2). Find the coordinates of D and then find the area of ABCD.

31. Show that $\frac{1}{2}$ and $\frac{-3}{2}$ are the zeroes of the polynomial $4x^2 + 4x - 3$ and verify the relationship between zeroes and coefficients of the polynomial.

32. Manoj selected a project to collect the number of runs scored by some batsmen of India in one-day cricket matches. After collecting the data, he prepared frequency distribution table and then prepares the given below cumulative frequency curve for the same. Construct the frequency distribution table using the less than cumulative frequency curve and then find the mode.
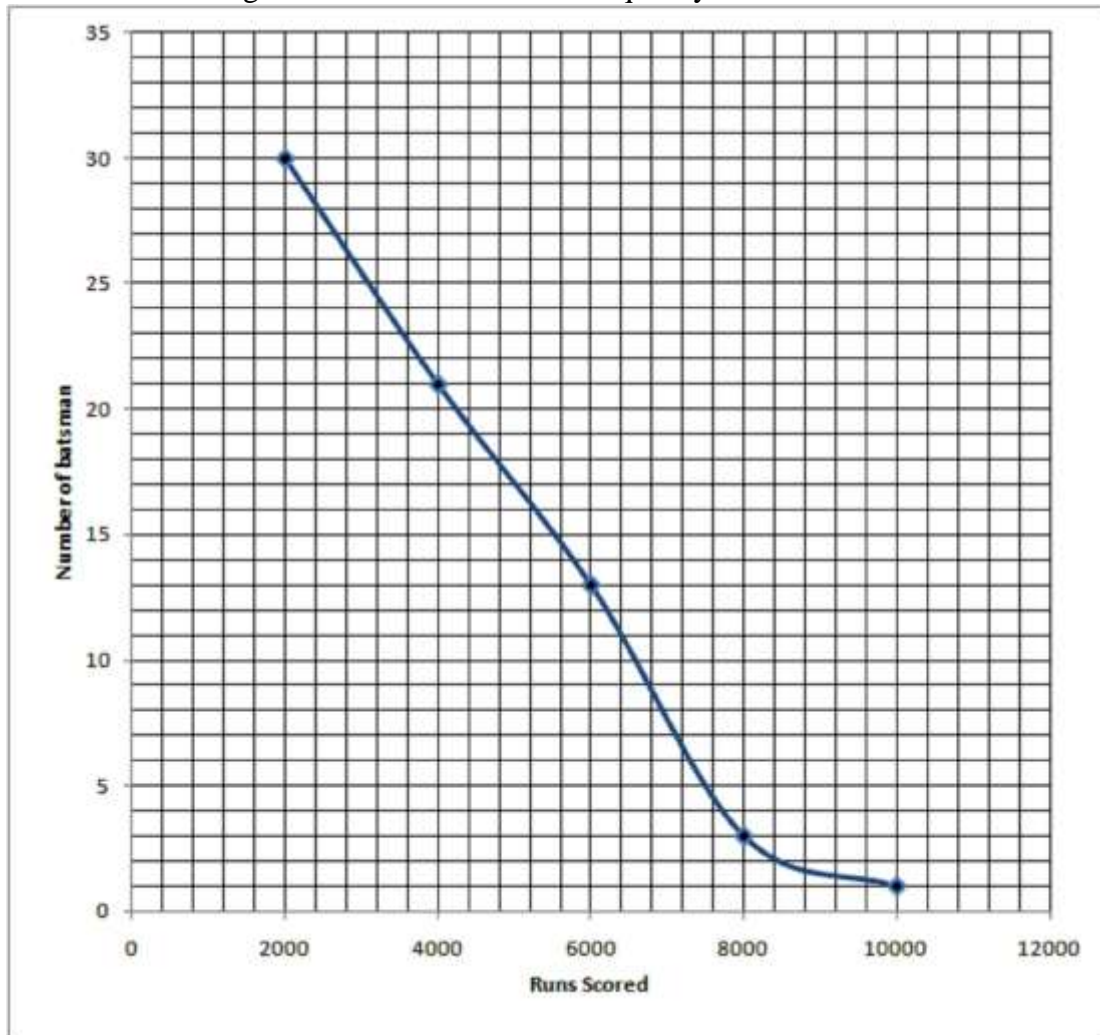
33. The sum of the numerator and denominator of a fraction is 4 more than twice the numerator. If the numerator and denominator both increased by 3, they are in the ratio 2:3. Determine the fraction.

OR

Determine the values of m and n, so that the following system of linear equations has infinite number of solutions: $(2m - 1)x + 3y - 5 = 0$; $3x + (n - 1)y - 2 = 0$.

34. A sum of Rs. 1600 is to be used to give 10 cash prize to students of a school for their overall academic performance. If each prize is Rs. 20 less than its preceeding prize, find the value of each of the prizes.

SECTION – D
Questions 23 to 30 carry 4 marks each.

35. The angle of elevation of the top of a vertical tower from a point on the ground is 60^0. From another point 10m vertically above the first, its angle of elevation is 45^0. Find the height of the tower.

36. A motor boat whose speed is 20 km/h in still water takes 1 hour more to go 48 km upstream than to return downstream to the same spot. Find the speed of the stream.

OR

A shopkeeper buys some books for Rs. 80. If he has bought 4 more books for the same amount, each book would have cost Rs. 1 less. Find the number of books he bought.

37. Construct a $\triangle$ ABC in which AC = 6 cm, AB = 5 cm and $\angle$ BAC = 45^0, then construct a triangle similar to the given triangle whose sides are $\frac{6}{5}$ of the corresponding sides of the $\triangle$ ABC.

OR

Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.

**38.** Prove that "If in a triangle, square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle."

39. A container shaped like a right circular cylinder having diameter 12 cm and height 15 cm is full of ice cream. The ice cream is to be filled into cones of height 12 cm and diameter 6 cm, having a hemispherical shape on the top. Find the number of such cones which can be filled with ice cream.

OR

A building is in the form of cylinder surmounted by a hemispherical dome (see below figure). The base diameter of the dome is equal to $\frac{2}{3}$ of the total height of the building. Find the height of the building if it contains $67\frac{1}{21}$ m^3 of air.
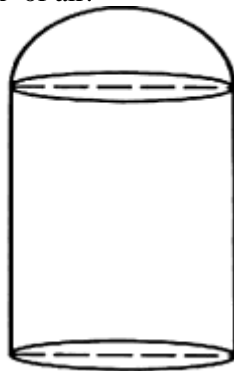
40. The following distribution gives the height of the students:

Height (in cm)	Less than 120	Less than 140	Less than 160	Less than 180	Less than 200
No. of students	12	26	34	40	50

Convert the distribution above to more than type cumulative frequency distribution, and draw its ogive.