

CLASS IX (2019-20)
MATHEMATICS (041)
SAMPLE PAPER-01

Time : 3 Hours**Maximum Marks : 80****General Instructions :**

- (i) All questions are compulsory.
 - (ii) The questions paper consists of 40 questions divided into four 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 choices have 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.
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SECTION A

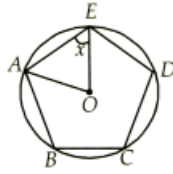
Q.1-Q.10 are multiple choice questions. Select the most appropriate answer from the given options.

- Q1. $0.12\bar{3}$ can be expressed in rational form as [1]
(a) $\frac{900}{111}$ (b) $\frac{111}{900}$
(c) $\frac{123}{10}$ (d) $\frac{121}{900}$
- Q2. Which one of the following algebraic expressions is a polynomial in variable x ? [1]
(a) $x^2 + \frac{2}{x^2}$ (b) $\sqrt{x} + \frac{1}{\sqrt{x}}$
(c) $x^2 + \frac{3x^{3/2}}{\sqrt{x}}$ (d) None of these
- Q3. If $p(a, b)$ lies in II quadrant then which of the following is true about a and b ? [1]
(a) $a > 0, b > 0$ (b) $a > 0, b < 0$
(c) $a < 0, b > 0$ (d) $a < 0, b < 0$
- Q4. If $P(x, y)$ and $P'(y, x)$ are same points then which of the following is true? [1]
(a) $x + y = 0$ (b) $xy = 0$
(c) $x - y = 0$ (d) $\frac{x}{y} = 0$
- Q5. According to Euclid's definition, the ends of a line are [1]
(a) breadth less (b) points
(c) length less (d) None of these
- Q6. An angle is 18° less than its complementary angle. The measure of this angle is [1]
(a) 36° (b) 48°
(c) 83° (d) 81°
- Q7. Can we draw a triangle ABC with $AB = 3$ cm, $BC = 3.5$ cm and $CA = 6.5$ cm? [1]
(a) Yes (b) No
(c) Can't be determined (d) None of these
- Q8. If in a quadrilateral, two adjacent sides are equal and the opposite sides are unequal, then it is called a [1]
(a) parallelogram (b) square
(c) rectangle (d) kite

Q9. The area of a rhombus is 20 cm^2 . If one of its diagonals is 5 cm, the other diagonal is [1]

- (a) 5 cm (b) 6 cm
(c) 8 cm (d) 10 cm

Q10. In the given pentagon $ABCDE$, $AB = BC = CD = DE = AE$. The value of x is [1]



- (a) 36° (b) 54°
(c) 72° (d) 108°

(Q.11-Q.15) Fill in the blanks :

Q11. The construction of a $\triangle LMN$ in which $LM = 8 \text{ cm}$, $\angle L = 45^\circ$ is possible when $(MN + LN)$ is cm. [1]

Q12. The sides of a triangle are 25 cm, 17 cm and 12 cm. The length of the altitude on the longest side is equal to cm. [1]

OR

Perimeter of an equilateral triangle is always equal to times of length of sides.

Q13. of a solid is the amount of space enclosed by the bounding surface. [1]

Q14. is the value of the middle most observation (s). [1]

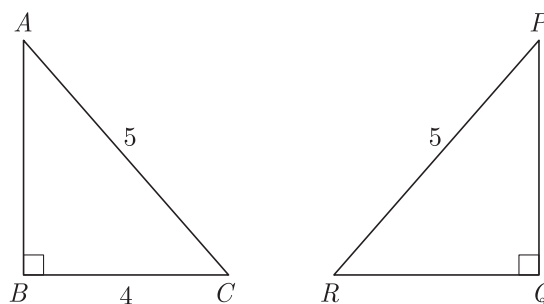
Q15. An activity which results in a well defined end is called an [1]

(Q.16-Q.20) Answer the following :

Q16. What is the degree of zero polynomial? [1]

Q17. Write the coordinates of the point which lies at a distance of x units from X -axis and y units from Y -axis. [1]

Q18. If $\triangle ABC$ is congruent to $\triangle PQR$, find the length of QR . [1]



Q19. The volume of a sphere is 38808 cm^3 . Find its radius. [1]

Q20. Find the range of the following data; [1]

25, 18, 10, 20, 22, 16, 6, 17, 12, 30, 29, 32, 10, 19, 13, 31.

SECTION B

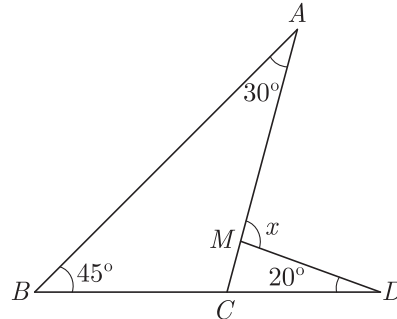
Q21. Simplify : $\sqrt{2a^2 + 2\sqrt{6}ab + 3b^2}$. [2]

OR

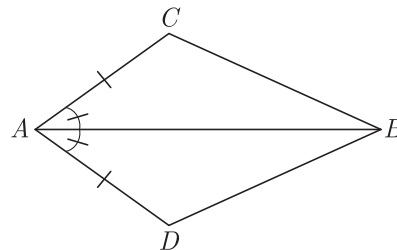
Simplify : $\frac{4 + \sqrt{6}}{4 - \sqrt{6}} + \frac{4 - \sqrt{6}}{4 + \sqrt{6}}$

Q22. State Euclid's fifth postulate. [2]

Q23. In the given figure, find the value of x . [2]

**OR**

In the given figure, if $BC = 2.6$ cm, then find $2BD + \frac{BC}{2}$.



Q24. Find the remainder when $3x^3 - 6x^2 + 3x - \frac{7}{9}$ is divided by $3x - 4$. [2]

Q25. Find the coordinates of the point : [2]

- (i) Which lies on x axes both.
- (ii) Whose abscissa is 2 and which lies on the x -axis.

Q26. The sides of a triangular field are 51 m, 37 m and 20 m. Find the number of flower beds that can be prepared, if each bed is to occupy 9 m^2 of space. [2]

OR

Two cylindrical vessels have their base radii as 16 cm and 8 cm respectively. If their heights are 8 cm and 16 cm respectively, then find the ratio of their volumes.

SECTION C

Q27. The following table gives the number of pairs of shoes and their corresponding price. [3]

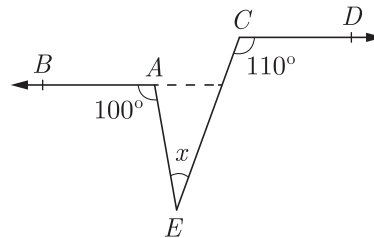
Number of pair of shoes	1	2	3	4	5	6
Corresponding price (₹ in hundred)	5	10	15	20	25	30

Plot these as ordered pairs and join them. What type of graph do you get ?

OR

Draw the graph of the linear equation $x + 2y = 8$ and find the point on the graph where abscissa is twice the value of ordinate.

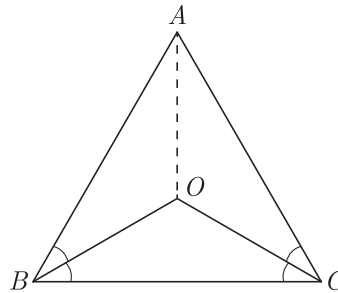
Q28. In the given figure, find $\angle x$ if $AB \parallel CD$. [3]



Q29. In an isosceles triangle ABC , with $AB = AC$, the bisectors of $\angle B$ and $\angle C$ intersect each other at O . Join A to O . Show that :

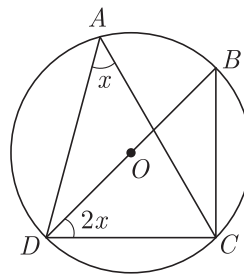
- (i) $OB = OC$
- (ii) AO bisects $\angle A$

[3]



Q30. In the given figure, O is the centre of the circle. Find the value of x .

[3]



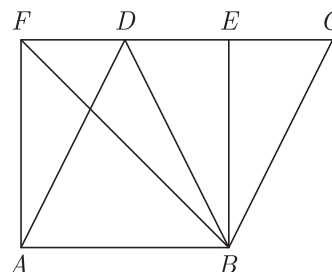
Q31. Construct an angle of $7\frac{1}{2}^\circ$, using compass and rules only.

[3]

Q32. The area of the parallelogram $ABCD$ is 90 cm^2 . Find

- (i) $ar(||gm ABEF)$
- (ii) $ar(\triangle ABD)$
- (iii) $ar(\triangle BEF)$

[3]



Q33. Find the ratio of the curved surface areas of two cones, if the diameters of their bases are equal and slant heights are in the ratio 3 : 4.

[3]

OR

The sides of a triangle are x , $x + 1$, $2x - 1$ and its area is $x\sqrt{10}$. Find the value of x .

- Q34. A batsman in his 12th inning makes a score of 63 runs and thereby increases his average score by 2. What is his average after the 12th inning ? [3]

OR

A die is rolled 300 times and following outcomes are recorded:

Outcomes	1	2	3	4	5	6
Frequency	42	60	55	53	60	30

Find the probability of getting a number (i) more than 4 (ii) less than 3.

SECTION D

- Q35. Simplify : $\frac{-3}{\sqrt{3} + \sqrt{2}} - \frac{3\sqrt{2}}{\sqrt{6} + \sqrt{3}} + \frac{4\sqrt{3}}{\sqrt{6} + \sqrt{2}}$ [4]

- Q36. If $(x^3 + ax^2 + bx + 6)$ has $(x - 2)$ as a factor and leaves a remainder 3 when divided by $(x - 3)$, then find the values of a and b . [4]

- Q37. Draw the graph of equation $5x + 3y = 4$ and check whether

(a) $x = 2, y = 5$

(b) $x = -1, y = 3$ are solution. [4]

OR

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.

- Q38. Prove that the quadrilateral formed by the internal angle bisectors of any quadrilateral is cyclic. [4]

- Q39. Find the mean, median and mode for the following data. [4]

10, 15, 18, 10, 10, 20, 10, 20, 15, 21, 15, 25

- Q40. 50 students of class IX planned to visit an old age home and to spend the whole day with their inmates. Each one prepared a cylindrical flower base using cardboard to gift the inmates. The radius of the cylindrical flower base is 4.2 cm and the height is 11.2 cm. [4]

What is the amount spent for purchasing the cardboard at the rate of ₹ 20 per 100 cm² ?

OR

Water is flowing at the rate of 3 km/hour through a circular pipe of 20 cm internal diameter into a circular cistern of diameter 10 m and depth 2 m. In how much time will the cistern be filled ?

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CLASS IX (2019-20)
MATHEMATICS (041)
SAMPLE PAPER-02

Time : 3 Hours**Maximum Marks : 80****General Instructions :**

- (i) All questions are compulsory.
- (ii) The questions paper consists of 40 questions divided into four 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 choices have 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

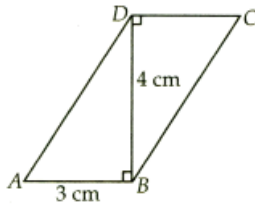
Q.1-Q.10 are multiple choice questions. Select the most appropriate answer from the given options.

- Q1. Set of natural numbers is a subset of [1]
(a) Set of even numbers (b) Set of odd numbers
(c) Set of composite numbers (d) Set of real numbers
- Q2. Degree of the polynomial $p(x) = (x+2)(x-2)$ is [1]
(a) 2 (b) 1
(c) 0 (d) 3
- Q3. A point lies on negative side of x -axis. Its distance from origin is 10 units. The coordinates of the point are [1]
(a) (10, 0) (b) (-10, 0)
(c) (0, 10) (d) (0, -10)
- Q4. If $(a, 1)$ lies on the graph of $3x - 2y + 4 = 0$, then $a =$ [1]
(a) $-\frac{2}{3}$ (b) $\frac{2}{3}$
(c) $\frac{3}{2}$ (d) $-\frac{3}{2}$
- Q5. If a point C lies between two point A and B such that $AC = BC$, then [1]
- 
- (a) $AC = AB$ (b) $AC = \frac{1}{2}AB$
(c) $AB = \frac{1}{2}AC$ (d) $AC = \frac{1}{3}AB$
- Q6. If $l \parallel m$, then value of x is [1]
(a) 60° (b) 120°
(c) 40° (d) Cannot be determined
- Q7. Which of the following is not a criterion for congruence of triangles? [1]
(a) SSA (b) SAS
(c) ASA (d) SSS

Q8. The angles of a quadrilateral are x° , $(x - 10)^\circ$, $(x + 30)^\circ$ and $(2x)^\circ$, the smallest angle is equal to [1]

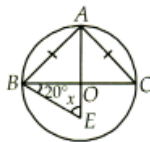
- (a) 68° (b) 52°
(c) 58° (d) 47°

Q9. In the adjoining figure, $ABCD$ is a parallelogram. Then its area is equal to [1]



- (a) 9 cm^2 (b) 12 cm^2
(c) 15 cm^2 (d) 36 cm^2

Q10. In the given figure, E is any point in the interior of the circle with centre O . Chord $AB = AC$. If $\angle OBE = 20^\circ$, the value of x is [1]



- (a) 40° (b) 45°
(c) 50° (d) 70°

(Q.11-Q.15) Fill in the blanks :

Q11. The construction of a $\triangle DEF$ in which $DE = 7 \text{ cm}$, $\angle D = 75^\circ$ is possible when $(DE - EF)$ is equal to cm. [1]

Q12. The sides of a triangular field are 33 m, 44 m and 55 m. the cost of levelling the field at the rate of ₹ 1.20 per m^2 is ₹ [1]

OR

If height of a triangle is doubled and base is tripled then its area become times.

Q13. The volume of a rectangular solid measuring 1 m by 50 cm by 0.5 m is cm^3 . [1]

Q14. The is the most frequently occurring observation. [1]

Q15. Total number of results are called [1]

(Q.16-Q.20) Answer the following :

Q16. Simplify : $\sqrt[5]{243a^{10}b^5c^{10}}$ [1]

Q17. If $p(x) = x^2 - 2\sqrt{2}x + 1$, then find $p(2\sqrt{2})$. [1]

OR

Find the remainder when $x^3 - px^2 + 6x - p$ is divided by $x - p$.

Q18. 'Two intersecting lines cannot be parallel to the same lines' is stated in which form. [1]

Q19. An isosceles right triangle has area 8 cm^2 . Find the length of its hypotenuse. [1]

OR

The base of a right triangle is 8 cm and hypotenuse is 10 cm. What is its area?

- Q20. Two coins are tossed simultaneously. List all possible outcomes. [1]

SECTION B

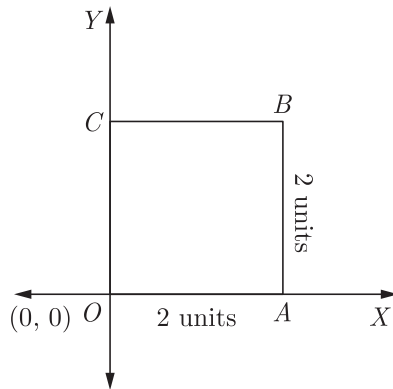
- Q21. If $x = \frac{\sqrt{7} + \sqrt{6}}{\sqrt{7} - \sqrt{6}}$, then find the value of $\left(x + \frac{1}{x}\right)^2$. [2]

- Q22. Find the value of k , for which the polynomial $x^3 - 3x^2 + 3x + k$ has 3 as its zero. [2]

OR

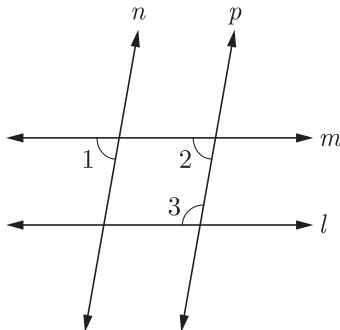
Give the equations of two lines passing through (2, 14). How many more such lines are there, and why ?

- Q23. In the figure, O is the origin and $OABC$ is a square of side 2 units. Find the co-ordinates of A , B and C . [2]



- Q24. One of the three angles of a triangle is twice the smallest and another is three times the smallest. Find the angles. [2]

- Q25. In the given figure, if $l \parallel m$, $n \parallel p$ and $\angle 1 = 75^\circ$, then find $\angle 3$. [2]



OR

The medians BE and CF of a $\triangle ABC$ intersect at G . Prove that $ar(\triangle GBC) = ar(\text{quad } AFGE)$.

- Q26. A solid right circular cone of radius 4 cm and height 7 cm is melted to form a sphere. Find the radius of sphere. [2]

OR

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

SECTION C

- Q27. The points $A(a, b)$ and $B(b, 0)$ lie on the linear equation $y = 8x + 3$.

- Find the value of a and b
- Is (2, 0) a solution of $y = 8x + 3$?
- Find two solutions of $y = 8x + 3$

[3]

OR

Draw graphs of $3x + 2y = 0$ and $2x - 3y = 0$ and what is the point of intersection of the two lines representing the above equation.

- Q28. The sides of a triangular park are 8 m, 10 m and 6 m respectively. A small circular area of diameter 2 m is to be left out and the remaining area is to be used for growing roses. How much area is used for growing roses ? [Take $\pi = 3.14$] [3]

OR

The area of an isosceles triangle is $8\sqrt{15} \text{ cm}^2$. If the base is 8 cm, find the length of each of its equal sides.

- Q29. Draw a $\triangle ABC$, in which $BC = 4 \text{ cm}$, $AB = 5 \text{ cm}$ and the median $BE = 3.5 \text{ cm}$. [3]

- Q30. Consider the marks, out of 100, obtained by 51 students of a class in a test, given below. [3]

Marks	Number of students
0-10	5
10-20	10
20-30	4
30-40	6
40-50	7
50-60	3
60-70	2
70-80	2
80-90	3
90-100	9
Total	51

Draw a histogram and frequency polygon for the above data on a same scale.

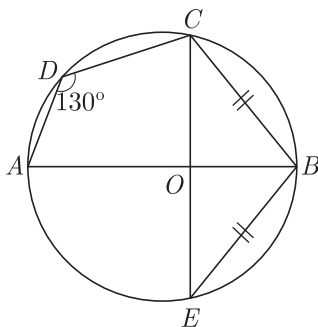
OR

For a particular year, following is the frequency distribution table of ages (in years) of primary school teachers in a district :

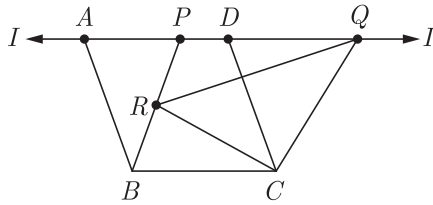
Age (in years)	Number of teachers
15-20	10
20-25	30
25-30	50
30-35	50
35-40	30
40-45	6
45-50	4

- Write the lower limit of the first class interval.
- Determine the class limits of the fourth class interval.
- Find the class mark of the class 45-50.

- Q31. In the given figure, $\angle ADC = 130^\circ$ and chord $BC =$ chord BE . Find $\angle CBE$. [3]



- Q32. In the given figure, parallelogram $ABCD$ and $PBCQ$ are given. If R is a point on PB , then show that $ar(\triangle QRC) = \frac{1}{2} ar(||gm ABCD)$. [3]



Q33. Prove that the mid point of the hypotenuse of a right angled triangle is equidistant from its vertices. [3]

Q34. Prove that the sum of any two sides of a triangle is greater than the third side. [3]

SECTION D

Q35. Simplify : [4]

$$\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \dots + \frac{1}{\sqrt{8}+\sqrt{9}}$$

Q36. Find the value of $x^3 - 8y^3 - 36xy - 220$, when $x = 2y + 6$. [4]

OR

Which of the following points $A(0, \frac{17}{3})$, $B(2, 6)$, $C(1, 5)$ and $D(5, 1)$ lie on the linear equation $2(x + 1) + 3(y - 2) = 13$.

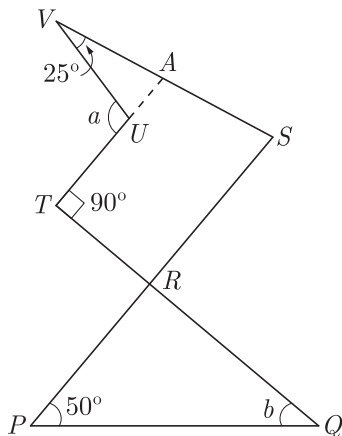
Q37. Factorise : $4x^4 + 7x^2 - 2$. [4]

Q38. The sum of the height and radius of the base of a solid cylinder is 37 cm. If the total surface area of the cylinder is 1628 cm^2 , then find its volume. [4]

OR

Three cubes of metal whose edges are in the ratio $3 : 4 : 5$ are melted down into a single cube whose diagonal is $12\sqrt{3} \text{ cm}$. Find the edges of the three cubes.

Q39. In the given figure, if $TU \parallel SR$ and $TR \parallel SV$, then find $\angle a$ and $\angle b$. [4]



Q40. The percentage of salary donated by twelve different households to an orphanage every month are : 2, 5, 3, 5, 6, 1, 2, 4, 3, 5, 2, 2. [4]

Find the mean, median and mode of the data.

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CLASS IX (2019-20)
MATHEMATICS (041)
SAMPLE PAPER-03

Time : 3 Hours

Maximum Marks : 80

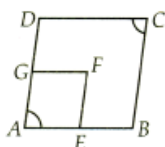
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- (v) Use of calculators is not permitted.

SECTION A

Q.1-Q.10 are multiple choice questions. Select the most appropriate answer from the given options.

- Q1. The rationalising factor of $\sqrt[5]{a^2 b^3 c^4}$ is [1]
 (a) $\sqrt[5]{a^3 b^2 c}$ (b) $\sqrt[4]{a^3 b^2 c}$
 (c) $\sqrt[3]{a^3 b^2 c}$ (d) $\sqrt{a^3 b^2 c}$
- Q2. Factorisation of $a^{2x} - b^{2x}$ is [1]
 (a) $(a^x + b^x)(a^x - b^x)$ (b) $(a^x - b^x)^2$
 (c) $(a^x + b^x)(a^2 - b^2)$ (d) $(a^x - b^x)(a^2 + b^2)$
- Q3. In which quadrant will $(-3, 4)$ lie? [1]
 (a) I quadrant (b) II quadrant
 (c) III quadrant (d) IV quadrant
- Q4. The number of solutions, the equation $3x + 5y + 15 = 0$ can have [1]
 (a) one only (b) exactly two
 (c) zero (d) infinite
- Q5. Two distinct intersecting lines l and m cannot have [1]
 (a) any point in common (b) one point in common
 (c) two points in common (d) None of these
- Q6. Supplement of angle is one fourth of itself. The measure of the angle is [1]
 (a) 18° (b) 36°
 (c) 144° (d) 72°
- Q7. In $\triangle ABC$, if $\angle B < \angle A$, then [1]
 (a) $BC > CA$ (b) $BC < CA$
 (c) $BC > AB + CA$ (d) $AB < CA$
- Q8. In the following figure, $ABCD$ and $AEFG$ are two parallelograms. If $\angle C = 55^\circ$, find $\angle F$. [1]



- (a) 65° (b) 75°
 (c) 85° (d) 55°

Q9. Which of the following figures lie on the same base and between the same parallels? [1]



Q10. In the given figure, O is the centre of circle. $\angle OPQ = 27^\circ$ and $\angle ORQ = 21^\circ$. The values of $\angle POR$ and $\angle PQR$ respectively are [1]



- (a) $84^\circ, 42^\circ$ (b) $96^\circ, 48^\circ$
 (c) $54^\circ, 42^\circ$ (d) $108^\circ, 54^\circ$

(Q.11-Q.15) Fill in the blanks :

Q11. If the lengths of two sides of an isosceles triangle are 4 cm and 10 cm, then the length of the third side is cm. [1]

Q12. The perimeter of a right angled triangle is 450 m. If its sides are in the ratio 5 : 12 : 13, then area of the triangle is m^2 . [1]

OR

If each side of a scalene triangle is halved then its area will reduced by percentage.

Q13. The sum of the areas of the plane and curved surfaces (faces) of a solid is called its surface area. [1]

Q14. is found by adding all the values of the observations and dividing this by the total number of observations. [1]

Q15. Probability of an event can be any from 0 to 1. [1]

(Q.16-Q.20) Answer the following :

Q16. If $125^x = \frac{25}{5^x}$, find the value of x . [1]

OR

What is the best way to evaluate $(996)^2$?

Q17. In which quadrants, abscissa of a point is negative? [1]

Q18. If two angles of a triangle are complementary, then what type of triangle will be formed? [1]

Q19. What is the lateral surface area of a cuboid with dimensions l , b and h ? [1]

Q20. If each observation of the data is decreased by 5, then what is the effect on the mean? [1]

SECTION B

Q21. Without actually calculating the cubes, find the value of $48^3 - 30^3 - 18^3$. [2]

OR

Find the value of x , if $5^{x-3} \times 3^{2x-8} = 225$.

- Q22. The polynomial $p(x) = x^4 - 2x^3 + 3x^2 - ax + 3a - 7$ when divided by $x + 1$, leaves the remainder 19. Find the value of a . Also, find the remainder when $p(x)$ is divided by $x + 2$. [2]

OR

Factorise : $2x^3 - 5x^2 - 19x + 42$.

- Q23. Find the coordinates of the point : [2]
 (i) Which lies on x and y axes both.
 (ii) Whose abscissa is 2 and which lies on the x -axis.

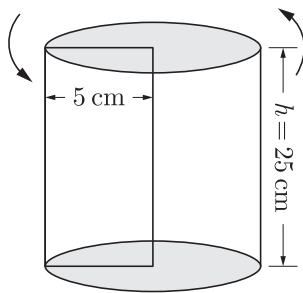
- Q24. If the complement of an angle is one-third of its supplement, find the angle ? [2]

OR

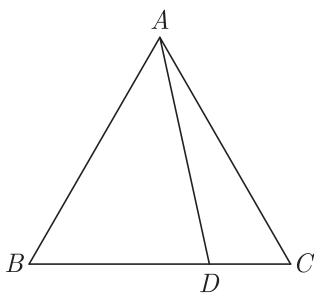
In $\triangle ABC$, if $\angle A = 50^\circ$ and $\angle B = 60^\circ$, determine the shortest and the longest side of the triangle.

- Q25. $ABCD$ is a rhombus. If $AC = 8$ cm, $DB = 6$ cm, find the length of BC . [2]

- Q26. A rectangle strip 5 cm \times 25 cm is rotated completely about the 25 cm side. Find the total surface area of the solid thus generated. [2]

**SECTION C**

- Q27. In the given figure, $AB > AC$ and D is any point on side BC of $\triangle ABC$. Prove that $AB > AD$. [3]



- Q28. The remainder of the polynomial $5 + bx - 2x^2 + ax^3$, when divided by $(x - 2)$ is twice the remainder when it is divided by $(x + 1)$. Show that $10a + 4b = 9$. [3]
- Q29. The mean of first 8 observations is 18 and last 8 observation is 20. If the mean of all 15 observations is 19, find the 8th observation. [3]

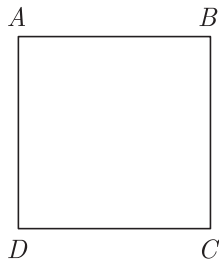
OR

Two coins are tossed simultaneously 200 times and the following outcomes are recorded :

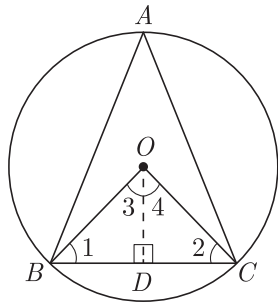
HH	HT/TH	TT
56	110	34

What is the empirical probability of occurrence of at least one head in the above case ?

- Q30. In the given figure, $AB \parallel DC$ and $AD \parallel BC$. Prove that, $\angle DAB = \angle DCB$. [3]



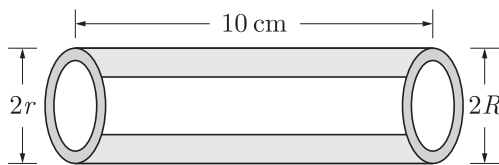
- Q31. The circumcentre of the triangle ABC is O . Prove that $\angle OBC + \angle BAC = 90^\circ$. [3]



- Q32. A spherical canon ball, 28 cm, in diameter is melted into a right circular conical mould, the base of which is 35 cm in diameter. Find the height of the cone, correct to one place of decimal. [3]

OR

The total surface area of a hollow metal cylinder open at both ends of external radius 8 cm and height 10 cm is $338\pi \text{ cm}^2$. Taking r to be inner radius, find the thickness of the metal in the cylinder.

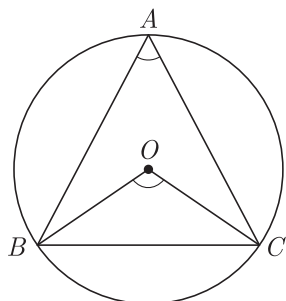


- Q33. Construct a $\triangle ABC$ whose perimeter is 12 cm and sides are in the ratio 3 : 4 : 5. [3]

OR

Construct a triangle ABC in which $BC = 7 \text{ cm}$, $\angle B = 75^\circ$ and $AB + AC = 13 \text{ cm}$.

- Q34. 3 STD booths situated at A , B and C in the figure are operated by handicapped persons. These three booths are equidistant from each other as shown in the figure. [3]



- (i) Find $\angle BAC$.
(ii) Find $\angle BOC$

SECTION D

- Q35. If $x = (5 + 2\sqrt{6})$, then show that $\sqrt{x} + \frac{1}{\sqrt{x}} = 2\sqrt{3}$. [4]

Q36. Factorise : $a^7 - ab^6$. [4]

Q37. Draw the graph of the equation $x - y = 3$. If $y = 3$, then find the value of x from the graph. [4]

OR

A and B are friends A is elder to B by 5 years. B 's sister C is half the age of B while A 's father D is 8 years older than twice the age of B . If the present age of D is 48 years, find the present ages of A , B and C .

Q38. Draw a frequency polygon representing the following frequency distribution. [4]

Class intervals	30-34	35-39	40-44	45-49	50-54	55-59
Frequency	12	16	20	8	10	4

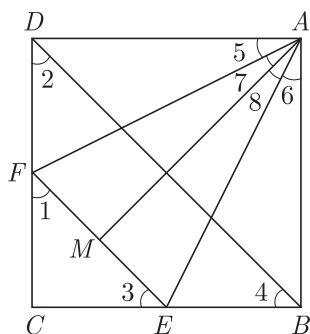
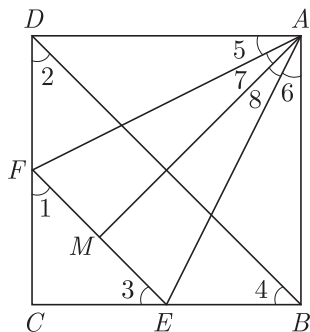
OR

The mean of 1, 7, 5, 3, 4 and 4 is m . The observations 3, 2, 4, 2, 3, 3 and p have mean $(m - 1)$ and median q . Find p and q .

Q39. The length of the sides of a triangle are in the ratio 3 : 4 : 5 and its perimeter is 144 cm. Find [4]

- the area of the triangle
- the height corresponding to the longest side

Q40. In the given figure, $ABCD$ is a square, EF is parallel to diagonal BD and $EM = FM$. [4]



Prove that

- $DF = BE$
- AM bisects $\angle BAD$.

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CLASS IX (2019-20)
MATHEMATICS (041)
SAMPLE PAPER-04

Time : 3 Hours

Maximum Marks : 80

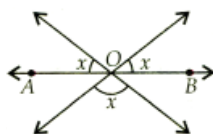
General Instructions :

- (i) All questions are compulsory.
- (ii) The questions paper consists of 40 questions divided into four 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 choices have 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

Q.1-Q.10 are multiple choice questions. Select the most appropriate answer from the given options.

- Q1. Rational number between $\sqrt{2}$ and $\sqrt{3}$ is [1]
 (a) $\frac{\sqrt{2} + \sqrt{3}}{2}$ (b) $\frac{\sqrt{2} \times \sqrt{3}}{2}$
 (c) 1.5 (d) 1.8
- Q2. If $8x^4 - 8x^2 + 7$ is divided by $2x + 1$, the remainder is [1]
 (a) $\frac{11}{2}$ (b) $\frac{13}{2}$
 (c) $\frac{15}{2}$ (d) $\frac{17}{2}$
- Q3. Point $(0, 3)$ lies [1]
 (a) on x -axis (b) on y -axis
 (c) in I quadrant (d) at origin
- Q4. The value of k , if $x = 2, y = -1$ is a solution of the equation $2x + 3y = k$ is [1]
 (a) 6 (b) 7
 (c) 5 (d) 1
- Q5. Which of the following needs a proof? [1]
 (a) Postulates (b) Definition
 (c) Proposition (d) Axiom
- Q6. The value of x if AOB is a straight line, is [1]



- (a) 36° (b) 60°
 (c) 30° (d) 35°
- Q7. Which of the following is a correct statement? [1]
 (a) Two triangles having same shape are congruent.
 (b) If two sides of a triangle are equal to the corresponding sides of another triangle, then the two triangles are congruent.

- (c) If the hypotenuse and one side of one right triangle are equal to the hypotenuse and one side of the other triangle, then the triangles are not congruent.
- (d) None of these

Q8. Which of the following statements is true? [1]

- (a) In a parallelogram, the diagonals are equal
- (b) In a parallelogram, the diagonals bisect each other.
- (c) In a parallelogram, the diagonals intersect each other at right angles.
- (d) In any quadrilateral, if a pair of opposite sides are equal, it is parallelogram.

Q9. The area of a rhombus if the lengths of whose diagonals are 16 cm and 24 cm, is [1]

- (a) 180 cm^2 (b) 184 cm^2
- (c) 198 cm^2 (d) 192 cm^2

Q10. In a cyclic quadrilateral, the difference between two opposite angles is 58° , the measures of opposite angles are [1]

- (a) $158^\circ, 22^\circ$ (b) $129^\circ, 51^\circ$
- (c) $109^\circ, 71^\circ$ (d) $119^\circ, 61^\circ$

(Q.11-Q.15) Fill in the blanks :

Q11. The construction of a triangle ABC , given that $BC = 6 \text{ cm}$, $\angle B = 45^\circ$ is not possible when difference of AB and AC is equal to cm. [1]

Q12. The percentage increase in the area of a triangle, if its each side is quadrupled, is equal to percentage. [1]

OR

If length of hypotenuse of an isosceles right angled triangle is $10\sqrt{2} \text{ cm}$ then its perimeter will be

Q13. The curved surface area of a right circular cone whose slant height is 10 cm and base radius is 7 cm is [1]

Q14. can also be drawn independently without drawing a histogram. [1]

Q15. A is an action which results in one of several outcomes. [1]

(Q.16-Q.20) Answer the following :

Q16. If the volume of a cuboid is $2x^2 - 16$, then find its possible dimensions. [1]

Q17. On which axes do the points $(3, 0)$ and $(0, 4)$ lie? [1]

Q18. In the given figure, $AB \parallel CD$, $\angle EAB = 50^\circ$. If $\angle ECD = 60^\circ$ [1]

Q19. The area of the base of a right circular cylinder is 154 cm^2 and its height is 15 cm. Find the volume of the cylinder. [1]

Q20. The class marks of a frequency distribution are 15, 20, 25, Find the class corresponding to the class mark 20. [1]

OR

If mean of 3, 5, 7, 9, x , is 5 then find the value of x .

SECTION B

Q21. If $\frac{\sqrt{3}-1}{\sqrt{3}+1} = a + b\sqrt{3}$, then find the values of a and b . [2]

OR

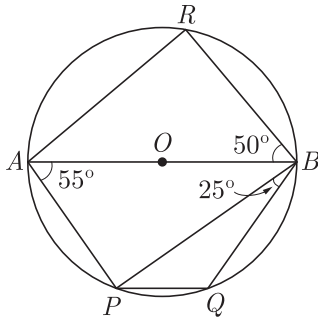
Simplify : $\frac{7+\sqrt{3}}{7-\sqrt{3}} + \frac{7-\sqrt{3}}{7+\sqrt{3}}$

- Q22. Write the coordinates of a point on x -axis at a distance of 4 units from the origin in the positive direction of x -axis and then justify your answer. [2]
- Q23. A chord of a circle is equal to its radius. Find the angle subtended by this chord at a point in major segment. [2]
- Q24. The sides of a triangle are 11 cm, 60 cm and 61 cm. Find the altitude of the smallest side. [2]

OR

The length of the sides of a triangle are $5x$, $5x$ and $8x$. Find the area of triangle.

- Q25. In the adjoining figure, AB is a diameter of a circle with centre O . If $\angle PAB = 55^\circ$, $\angle PBQ = 25^\circ$ and $\angle ABR = 50^\circ$, then find $\angle PBA$ and $\angle BAR$. [2]



- Q26. Find a point on x -axis from where graph of linear equation $2x = 1 - 5y$ will pass. [2]

OR

If the points $(1, 0)$ and $(2, 1)$ lie on the graph of $\frac{x}{a} + \frac{y}{b} = 1$, then find the values of a and b .

SECTION C

- Q27. Draw the graph of linear equation $x + 2y = 8$. From the graph, check whether $(-1, -2)$ is a solution of this equation. [3]

OR

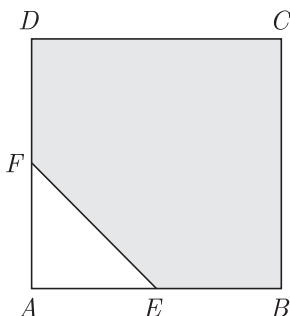
Solve : $\frac{5}{x} + 6y = 13$, $\frac{3}{x} + 4y = 7$.

- Q28. A teak wood log is cut first in the form of a cuboid of length 2.3 m, width 0.75 m and of a certain thickness. Its volume is 1.104 m^3 . How many rectangular planks of size $2.3 \text{ m} \times 0.75 \text{ m} \times 0.04 \text{ m}$ can be cut from the cuboid ? [3]

OR

A cylindrical roller 2.5 m in length, 1.5 m in radius when rolled on a road was found to cover the area of 16500 m^2 . How many revolutions does it make ?

- Q29. In the given figure, $ABCD$ is a square of side 4 cm. E and F are the mid points of AB and AD respectively. Find the area of the shaded region. [3]



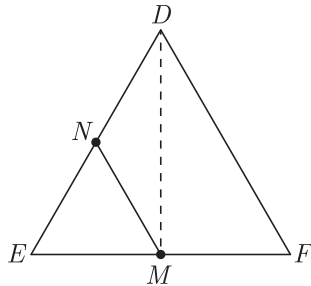
- Q30. Find the median of descending order 34, 32, x , $x - 1$, 19, 15, 11 where x is the mean of 10, 20, 30, 40, 50. [3]

OR

A bag contains 12 balls out of which x balls are white. If one ball is taken out from the bag, find the probability of getting a white ball. If 6 more white balls are added to the bag and the probability now for getting a white ball is double the previous one, find the value of x .

Q31. Draw line l and m intersected by a transversal t . Construct angle bisectors of the interior angle on same side of the transversal. [3]

Q32. In $\triangle DEF$, M and N are mid-points of sides EF and DE respectively. If $ar(\triangle ENM) = 4 \text{ cm}^2$, find $ar(\triangle DEF)$. [3]



Q33. Prove that the circle drawn on any of the equal sides of an isosceles triangle as diameter bisects the base. [3]

Q34. If two interior angles on the same side of a transversal intersecting two parallel lines are in the ratio 3 : 2, then find the greater of the two angles. [3]

SECTION D

Q35. If $x = (2 + \sqrt{5})^{1/2} + (2 - \sqrt{5})^{1/2}$ and $y = (2 + \sqrt{5})^{1/2} - (2 - \sqrt{5})^{1/2}$ evaluate $x^2 + y^2$. [4]

OR

If $a = \frac{1}{7 - 4\sqrt{3}}$ and $b = \frac{1}{7 + 4\sqrt{3}}$, find the values of the following :

(i) $a^2 + b^2$

(ii) $a^3 + b^3$

Q36. Simplify : $\left[\frac{(4x^2 - 9y^2)^3 + (9y^2 - 16z^2)^3 + (16z^2 - 4x^2)^3}{(2x - 3y)^3 + (3y - 4z)^3 + (4z - 2x)^3} \right]$. [4]

Q37. The linear equation that converts Fahrenheit (F) to Celsius (C) is given by the relation $C = \frac{5F - 160}{9}$ [4]

(i) If the temperature is 86°F , what is the temperature in Celsius ?

(ii) If the temperature is 35°C , what is the temperature in Fahrenheit ?

(iii) If the temperature is 0°F , what is the temperature in Celsius ?

(iv) What is the numerical value of the temperature which is same in both the scales ?

Q38. In $\triangle ABC$, if AD is the median, then prove that $AB^2 + AC^2 = 2AD^2 + \frac{1}{2}BC^2$. [4]

Q39. A random survey of the number of children of various age groups playing football match in a park was found as follows [4]

Age (in years)	Number of children
1-2	5
2-3	4
3-5	10
5-7	12
7-10	9
10-15	10
15-17	8

Draw a histogram to represent the above data.

OR

If the mean of the following frequency distribution is 28.25, find the value of p .

x_i	15	20	25	30	35	40
f_i	8	7	p	14	15	6

- Q40. While selling clothes for making flags, a shopkeeper claims to sell each piece of cloth in the shape of an equilateral triangle of each side 10 cm while actually he was selling the same in the shape of an isosceles triangle with sides 10 cm, 10 cm and 8 cm. How much cloth was he saving in selling each flag ? [4]

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CLASS IX (2019-20)
MATHEMATICS (041)
SAMPLE PAPER-05

Time : 3 Hours**Maximum Marks : 80****General Instructions :**

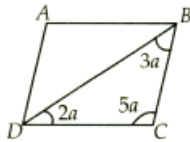
- (i) All questions are compulsory.
- (ii) The questions paper consists of 40 questions divided into four sections A, B, C and D.
- (iii) Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.
- (iv) There is no overall choice. However, an internal choices have 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

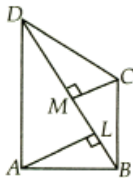
Q.1-Q.10 are multiple choice questions. Select the most appropriate answer from the given options.

- Q1. The value of $\left(\frac{x^q}{x^r}\right)^{\frac{1}{qr}} \times \left(\frac{x^r}{x^p}\right)^{\frac{1}{rp}} \times \left(\frac{x^p}{x^q}\right)^{\frac{1}{pq}}$ is equal to [1]
- (a) $x^{\frac{1}{p} + \frac{1}{q} + \frac{1}{r}}$ (b) 0
(c) $x^{pq + qr + rp}$ (d) 1
- Q2. For the polynomial $p(x) = x^5 + 4x^3 - 5x^2 + x - 1$, one of the factors is [1]
- (a) $(x + 1)$ (b) $(x - 1)$
(c) x (d) $(x + 2)$
- Q3. The point for which the abscissa and ordinate have same signs will lie in [1]
- (a) I and II quadrants (b) I and III quadrants
(c) I and IV quadrants (d) III and IV quadrants
- Q4. Which of the following equation has graph parallel to y -axis? [1]
- (a) $y = -2$ (b) $x = 1$
(c) $x - y = 2$ (d) $x + y = 2$
- Q5. Axioms are [1]
- (a) universal truths in all branches of Mathematics
(b) universal truths specific to geometry
(c) theorems
(d) definitions
- Q6. If two parallel lines are intersected by a transversal, then each pair of corresponding angles so formed is [1]
- (a) Equal (b) Complementary
(c) Supplementary (d) None of these
- Q7. Which of the following is a correct statement? [1]
- (a) In an isosceles triangle, the angles opposite to equal sides are equal.
(b) If the hypotenuse and an acute angle of the right-angled triangle are not equal to the hypotenuse and the corresponding acute angle of another triangle, then the triangles are congruent.
(c) The bisector of the vertical angle of an isosceles triangle bisects the base at acute angles.
(d) All of these

- Q8. In the given figure, the measure of $\angle C$ is equal to [1]



- (a) 90° (b) 80°
(c) 75° (d) 95°
- Q9. In the adjoining figure, $ABCD$ is a quadrilateral in which diagonal $BD = 14$ cm. If $AL \perp BD$ and $CM \perp BD$ such that $AL = 8$ cm and $CM = 6$ cm, then area of quadrilateral $ABCD$ is [1]



- (a) 60 cm^2 (b) 72 cm^2
(c) 84 cm^2 (d) 98 cm^2
- Q10. Which of the following statements is true for a regular pentagon? [1]
- (a) All vertices are con-cyclic.
(b) All vertices are not con-cyclic.
(c) Only four vertices are con-cyclic
(d) Cannot say anything about regular pentagon

(Q.11-Q.15) Fill in the blanks :

- Q11. The construction of a triangle ABC , given that $BC = 3$ cm, $\angle C = 60^\circ$ is possible when difference of AB and AC is equal to cm [1]
- Q12. The length of the sides of a triangle are 4 cm, 6 cm and 8 cm. The length of perpendicular from the opposite vertex to the side whose length is 8 cm, is equal to cm. [1]

OR

Area of a triangle with perimeter 42 cm and length of two sides 18 cm and 10 cm is given by

- Q13. A sphere has only surface and that is curved. [1]
- Q14. If n is an odd number, the median = value of the observation. [1]
- Q15. Number of favourable outcomes for an event cannot be than the number of total outcomes. [1]

(Q.16-Q.20) Answer the following :

- Q16. The hollow sphere, in which the circus motorcyclist performs his stunt, has a diameter of 7 m. Find the area available to the motorcyclist for riding? [1]
- Q17. Find k , if $x^{51} + 2x^{60} + 3x + k$ is divisible by $x + 1$. [1]
- Q18. Which of the following points lies in II-quadrant. [1]
 $A(2, 3), B(-2, 6), C(-2, -3), D(-1, 2), E(4, 1)$.
- Q19. The radius of a cone is 3 cm and vertical heights is 4 cm. Find the area of the curved surface. [1]
- Q20. Find the probability of Sun revolving around Earth. [1]

SECTION B

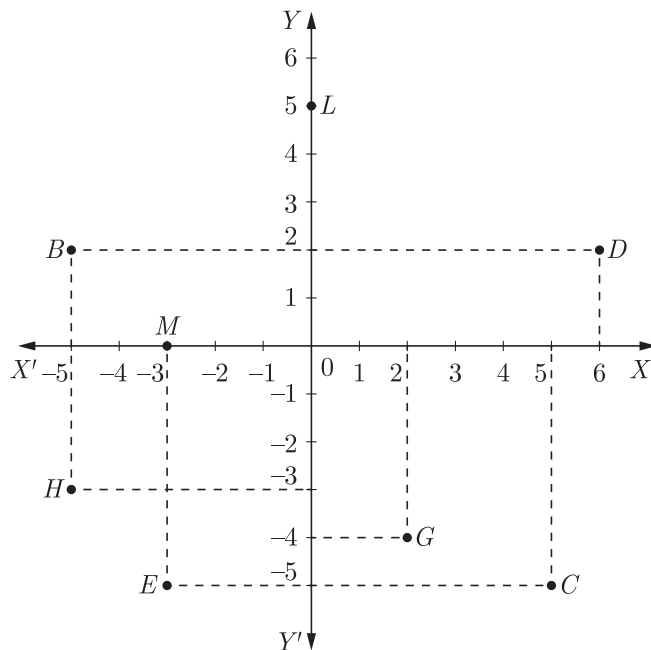
- Q21. Simplify : $\frac{6^{2/3} \times \sqrt[3]{6^7}}{\sqrt[3]{6^6}}$. [2]

OR

If $\frac{5+2\sqrt{3}}{7+4\sqrt{3}} = a + b\sqrt{3}$, find the values of a and b .

- Q22. If $\left(x + \frac{1}{x}\right) = 9$, then find the value of $x^3 + \frac{1}{x^3}$. [2]

- Q23. See Fig. and write the following : [2]



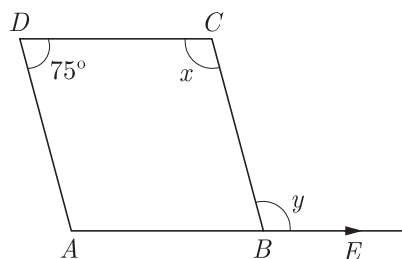
- (i) The coordinates of B .
- (ii) The coordinates of C .
- (iii) The point identified by the coordinates $(-3, -5)$.
- (iv) The point identified by the coordinates $(2, -4)$.

- Q24. Find the area of regular hexagon of side a cm. [2]

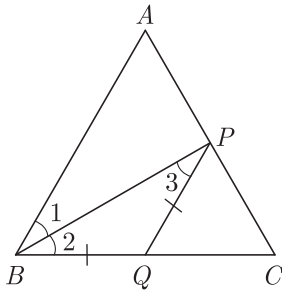
OR

The sides of a triangle are 4 cm, 8 cm and 6 cm. Find the length of the perpendicular from the opposite vertex to the longest side.

- Q25. $ABCD$ is a parallelogram in which $\angle ADC = 75^\circ$ and side AB is produced to point E as shown in the figure. Find $(x + y)$. [2]



- Q26. P is a point on the bisector of $\angle ABC$. If the line through P , parallel to BA meet BC at Q , prove that BPQ is an isosceles triangle. [2]



OR

In quadrilateral $PQRS$, if $\angle P = 60^\circ$ and $\angle Q : \angle R : \angle S = 2 : 3 : 7$, then find the value of $\angle S$.

SECTION C

- Q27. Find the remainder, when $3x^3 - 6x^2 + 3x - \frac{7}{9}$ is divided by $3x - 4$. [3]

OR

Write the equation of the lines drawn in following graph. Also, find the area enclosed between them.

- Q28. A family with monthly income of ₹ 30,000 had planned the following expenditures per month under various heads : [3]

Heads	Expenditure (in ₹ 1000)
Rent	5
Grocery	4
Clothings	3
Education of children	5
Medicine	2
Entertainment	3
Miscellaneous	6
Savings	2

Draw a bar graph for the above data.

OR

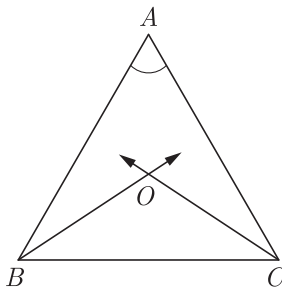
If the mean of five observations x , $x + 2$, $x + 4$, $x + 6$ and $x + 8$ is 11. Find the value of x .

- Q29. Find the curved surface area and total surface area of a hemisphere of radius 35 cm. [3]

OR

The volume of a cylindrical rod is 628 cm^3 . If its height is 20 cm, find the radius of its cross section. (Use $\pi = 3.14$).

- Q30. In the given figure, the bisectors of $\angle ABC$ and $\angle BCA$, intersect each other at point O . If $\angle BOC = 100^\circ$, then find $\angle A$. [3]



- Q31. Write true or false and justify your answer. If the side of a rhombus is 10 cm and one diagonal is 16 cm, the area of the rhombus is 96 cm^2 . [3]
- Q32. $ABCD$ is a parallelogram. A circle through A and B is drawn, so that it intersects AD at P and BC at Q . Prove that P , Q , C and D are concyclic. [3]

- Q33. Two equal chords AB and CD of a circle when produced, intersect at a point P . Prove that $PB = PD$. [3]
- Q34. Draw a right angled triangle whose hypotenuse measure 6 cm and the length of one of whose sides containing the right angle is 4 cm. [3]

SECTION D

- Q35. A recent survey found that the age of workers in a factory as follows : [4]

Age (in yrs)	Number of workers
20-29	38
30-39	27
40-49	86
50-59	46
60 and above	3

If a person is selected at random, then find the probability that the person is

OR

The mean of the following frequency distribution is 16.6.

x_i	8	12	15	18	20	25	30	Total
f_i	12	16	p	24	16	q	4	100

Find the missing frequencies p and q .

- Q36. If $x = \frac{1}{2 - \sqrt{3}}$, then find the value of $x^3 - 2x^2 - 7x + 5$. [4]
- Q37. Water flows in a tank $150 \text{ m} \times 100 \text{ m}$ at the base through a pipe whose cross-section is $2 \text{ dm} \times 1.5 \text{ dm}$ at the speed of 15 km/h . In what time, will the water be 3 m deep ? [4]

OR

An open rectangular cistern is made of iron 2.5 cm thick. When measured from outside, it is $1 \text{ m } 25 \text{ cm}$ long, $1 \text{ m } 5 \text{ cm}$ broad and 90 cm deep.

Find :

- (i) the capacity of the cistern in litres
- (ii) the volume of iron used
- (iii) the total surface area of the cistern

- Q38. Find the zeroes of the given polynomial $f(x) = 2x^3 + 3x^2 - 11x - 6$. [4]
- Q39. AB and AC are two chords of a circle of radius r such that $AB = 2AC$. If p and q are the distances of AB and AC from the centre then prove that $4q^2 = p^2 + 3r^2$. [4]
- Q40. A man hires an auto rickshaw to cover a certain distance. The fare is ₹10 for first kilometre and ₹7 for subsequent kilometres. Taking total distance covered as $x \text{ km}$ and total fare as ₹ y . [4]
- (i) Write a linear equation for this.
 - (ii) The man covers a distance of 16 km and gave ₹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.

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CLASS IX (2019-20)
MATHEMATICS (041)
SAMPLE PAPER-06

Time : 3 Hours**Maximum Marks : 80****General Instructions :**

- (i) All questions are compulsory.
- (ii) The questions paper consists of 40 questions divided into four 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 choices have 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

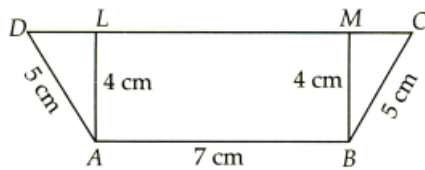
Q.1-Q.10 are multiple choice questions. Select the most appropriate answer from the given options.

- Q1. The rational number between $\frac{1}{2}$ and $\frac{1}{3}$ is [1]
(a) $\frac{2}{5}$ (b) $\frac{1}{5}$
(c) $\frac{3}{5}$ (d) $\frac{4}{5}$
- Q2. Which of the following algebraic expressions is not a polynomial ? [1]
(a) $\frac{17}{2}x^2 + x - 3$ (b) $\sqrt{7}x^3 + 3x^{2/3} - 8$
(c) 3 (d) 0
- Q3. Point $(-2, 3)$ lies in the [1]
(a) first quadrant (b) second quadrant
(c) third quadrant (d) fourth quadrant
- Q4. The distance between $M(-1, 5)$ and $N(x, 5)$ is 8 units. The value of x is [1]
(a) -9 or 9 (b) -7 or 9
(c) -9 or 7 (d) -7 or -9
- Q5. Euclid's Postulate 1 is [1]
(a) A straight line may be drawn from any point to any other point.
(b) A terminated line can be produced indefinitely.
(c) All right angles are equal to one another.
(d) None of these
- Q6. If the supplement of an angle is three times its complement, then angle is [1]
(a) 40° (b) 35°
(c) 50° (d) 45°
- Q7. In triangles ABC and RPQ , if $AB = AC$, $\angle C = \angle P$ and $\angle B = \angle Q$, then two triangles are [1]
(a) isosceles but not necessarily congruent
(b) isosceles and congruent
(c) congruent but not isosceles
(d) neither congruent nor isosceles

Q8. A quadrilateral having only one pair of opposite sides parallel is called a [1]

- (a) square (b) rhombus
(c) trapezium (d) parallelogram

Q9. In figure, $ABCD$ is a trapezium in which $AB \parallel DC$. Find the length of DC . [1]



- (a) 17 cm (b) 11 cm
(c) 13 cm (d) 15 cm

Q10. In a cyclic quadrilateral $ABCD$, if two sides are parallel, which of the following statements is definitely false? [1]

- (a) Remaining two sides are equal
(b) Diagonals are not equal
(c) Diagonals intersect at the centre of circle
(d) Both (a) and (c)

(Q.11-Q.15) Fill in the blanks :

Q11. The construction of a $\triangle LMN$ in which $LM = 8$ cm, $\angle L = 45^\circ$ is possible when $(MN + LN)$ is cm. [1]

Q12. The lengths of the three sides of a triangular field are 40 m, 24 m and 32 m respectively. The area of the triangle is m^2 . [1]

Q13. Cube is a special form of [1]

Q14. The of a class interval is called its class mark. [1]

Q15. Probability of an event can be any from 0 to 1. [1]

(Q.16-Q.20) Answer the following :

Q16. Determine the degree of the polynomial : $x^3(2 - x^3)$. [1]

Q17. In the given figure, find the point identify the coordinate $(-5, 3)$. [1]

Q18. Solve the equation $m - 25 = 40$ and state which axiom will use here? [1]

Q19. If the length of a median of an equilateral triangle is x cm, find its area. [1]

Q20. A boy says that the median of 4, 15, 19, 21 and 6 is 19. What does not the boy understand about finding the median? [1]

SECTION B

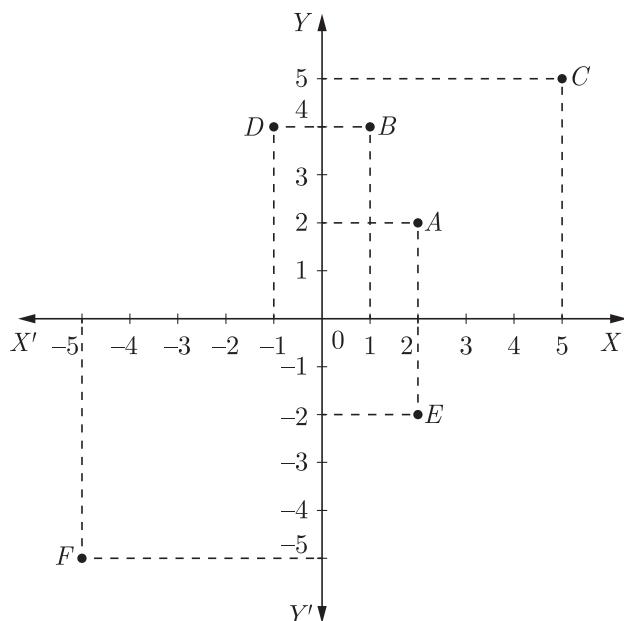
Q21. Simplify : $\frac{1}{\sqrt{5} + \sqrt{3}} + \frac{1}{2}(\sqrt{5} - \sqrt{3})$ [2]

OR

If $\sqrt{3} = 1.732$ and $\sqrt{2} = 1.414$, then find the value of $\frac{1}{\sqrt{3} - \sqrt{2}}$.

Q22. Write two solutions of the linear equation $x + 2y = 1$. [2]

- Q23. From the following figure, find the coordinates of the points A, B, C, D, E and F . Which of the points are mirror images in (i) x -axis, (ii) y -axis. [2]

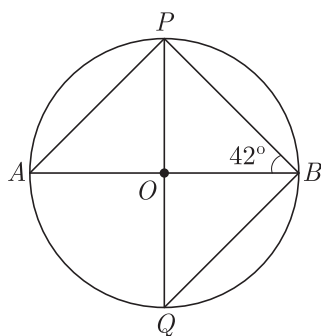


- Q24. In $\triangle ABC$, if $\angle A = (2x - 5^\circ)$, $\angle B = (5x + 5^\circ)$ and $\angle C = (3x + 50^\circ)$, then find the values of x and $\angle C$. [2]

OR

In $\triangle ABC$, if $\angle A : \angle B : \angle C = \frac{1}{2} : \frac{1}{3} : \frac{1}{6}$, then calculate the measures of $\angle A$, $\angle B$ and $\angle C$.

- Q25. In the following figure, find the measure of $\angle PQB$, where O is the centre of the circle. [2]



- Q26. The height of a cylinder is 15 cm and the curved surface area is 660 cm^2 . Find its radius. [2]

OR

The diameter of the moon is approximately one fourth of the diameter of the earth. Find the ratio of their surface areas.

SECTION C

- Q27. If $(x + 4)$ is a factor of the polynomial $x^3 - x^2 - 14x + 24$, find its other factors. [3]

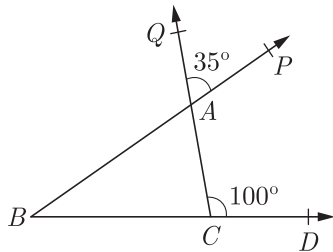
OR

Let R_1 and R_2 are the remainders when polynomial $f(x) = 4x^3 + 3x^2 + 12ax - 5$ and $g(x) = 2x^3 + ax^2 - 6x - 2$ are divided by $(x - 1)$ and $(x - 2)$ respectively. If $3R_1 + R_2 - 28 = 0$, find the value of a .

- Q28. If two parallel lines are intersected by a transversal, then prove that the bisectors of two alternate interior angles are parallel. [3]

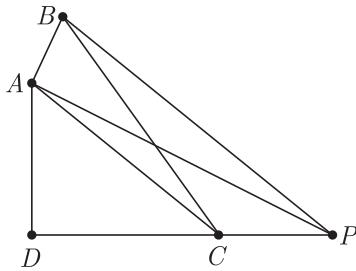
OR

Side BC , CA and BA of triangle ABC produced to D , Q , P respectively as shown in the figure. If $\angle ACD = 100^\circ$ and $\angle QAP = 35^\circ$, find all the angles of a triangle.

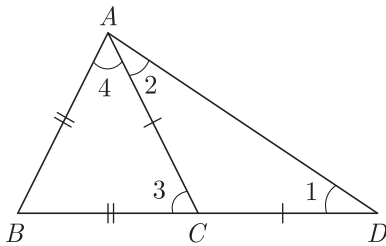


- Q29. The diagonals of a quadrilateral $ABCD$ are perpendicular, show that quadrilateral formed by joining the mid-points of its sides, is rectangle. [3]

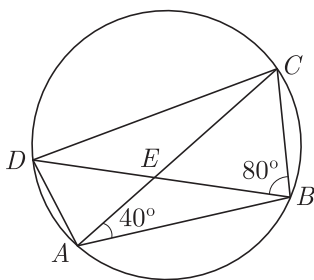
- Q30. In the given figure, $ABCD$ is a quadrilateral. BP is drawn parallel to AC and BP meets DC (produced) at P . Prove that $ar(\triangle ADP) = ar(\text{quadrilateral } ABCD)$. [3]



- Q31. In the given figure, $AB = BC$ and $AC = CD$. Prove that $\angle BAD : \angle ADB = 3 : 1$. [3]



- Q32. In the given figure, if $\angle DBC = 80^\circ$ and $\angle BAC = 40^\circ$, then find $\angle BCD$. Further, if $AB = BC$, then find $\angle ECD$. [3]



- Q33. The length, breadth and height of a cuboid are 8 m, 6 m and 4 m respectively. Find its total surface area, diagonal and area of four walls. [3]

OR

A heap of wheat is in the form of a cone whose diameter is 10.5 m and height is 3 m. Find its volume. The heap is to be covered with canvas, find the area of the canvas required.

- Q34. The probabilities of a student getting A , B , C and D grades are 0.35, 0.25, 0.35 and 0.05. Then, find the probability that a student gets atmost grade C . [3]

SECTION D

- Q35. Find nine rational numbers between 0 and 0.1. [4]

- Q36. Factorise, $2x^3 - 5x^2 - 19x + 42$. [4]
- Q37. The parking charges of a car in a parking lot is ₹ 30 for the first two hours and ₹ 10 per hour for subsequent hours. Taking total parking time to be x hours and total charges as ₹ y , write a linear equation in two variables to express the above statement. Draw a graph for the linear equation and read the charges for five hours. [4]
- Q38. Construct an angle of 150° of the initial point of a given ray and justify the construction. [4]

OR

Construct a right triangle whose base is 12 cm and sum of its hypotenuse and other side is 18 cm.

- Q39. What length of tarpaulin 3 m wide will be required to make conical tent of height 8 m and base radius 6m ? Assume that the extra length of material that will be required for stitching margins and wastage in cutting is approximately 20 cm. (Take $\pi = 3.14$) [4]
- Q40. Cards marked with the numbers 2 to 101 are placed in a box and mixed thoroughly. One card is drawn from this box. Find the probability that the number on the card is : [4]
- (i) an even number
 - (ii) a number less than 14
 - (iii) a number which is a perfect square.

OR

The average weight of all male stars in a multi-star Bollywood movie is 71.2 kg where as average weight of all female co-stars is 50.8 kg. If the mean weight of male and female stars acting in the movie is 60 kg. Find the ratio of number of male stars to the number of female co-stars acting in the movie.

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CLASS IX (2019-20)
MATHEMATICS (041)
SAMPLE PAPER-07

Time : 3 Hours**Maximum Marks : 80****General Instructions :**

- (i) All questions are compulsory.
 - (ii) The questions paper consists of 40 questions divided into four 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 choices have 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

Q.1-Q.10 are multiple choice questions. Select the most appropriate answer from the given options.

- Q1. If $25^{x-1} = 5^{2x-1} - 100$, then the value of x is. [1]
(a) 3 (b) 2
(c) 4 (d) 1
- Q2. One of the dimensions of the cuboid whose volume is $16x^2 - 26x + 10$ is [1]
(a) 2 (b) $(8x - 5)$
(c) $(x - 1)$ (d) All of these
- Q3. Point $(0, -2)$ lies [1]
(a) on the x -axis (b) in the second quadrant
(c) on the y -axis (d) none of these
- Q4. An ordered pair that satisfy an equation in two variables is called its. [1]
(a) Zero (b) Root
(c) Solution (d) Both (b) and (c)
- Q5. Priya and Pooja have the same amount of money. If each gets ₹4000 more, how will their new amounts be compared?[1]
(a) Amount with Priya is less than that with Pooja
(b) Amount with Pooja is less than that with Priya
(c) Both have same amount of money
(d) None of these
- Q6. Which one of the following statements is not false? [1]
(a) If two angles form a linear pair, then each of these angles is of measure 90°
(b) Angles forming a linear pair can both be acute angles.
(c) Both of the angles forming a linear pair can be obtuse angles.
(d) Bisectors of the adjacent angles forming a linear pair form a right angle.
- Q7. In triangles ABC and PQR , $AB = PQ$ and $\angle B = \angle Q$. The two triangles will be congruent by SAS axiom if [1]
(a) $BC = QR$ (b) $AC = PR$
(c) $AB = QR$ (d) None of these

- Q8. A quadrilateral has three acute angles each measuring 70° . The measure of fourth angle is [1]
 (a) 140° (b) 150°
 (c) 105° (d) 120°
- Q9. Parallelograms on the same base and between the same parallels are equal in [1]
 (a) perimeter (b) volume
 (c) area (d) weight
- Q10. In the given figure, chord $RS =$ chord NS . How \widehat{RS} is related with \widehat{NS} ? [1]



- (a) \widehat{RS} is smaller than \widehat{NS} (b) Both are equal
 (c) \widehat{RS} is greater than \widehat{NS} (d) None of these

(Q.11-Q.15) Fill in the blanks :

- Q11. The construction of a $\triangle DEF$ in which $DE = 7$ cm, $\angle D = 75^\circ$ is possible when $(DE - EF)$ is equal to cm. [1]
- Q12. A triangle and parallelogram have the same base and the same area. If the sides of the triangle are 34 cm, 42 cm and 20 cm, then the height of parallelogram having base 42 cm, is equal to cm. [1]

OR

Area of a triangle with the length of sides a, b, c is given by $\sqrt{s(s-a)(s-b)(s-c)}$ by formula.

- Q13. A right circular cone is generated by revolving a right angled triangle about one of the sides containing the [1]
- Q14. The of all bars in histogram should be uniform. [1]
- Q15. A is an action which results in one of several outcomes. [1]

(Q.16-Q.20) Answer the following :

- Q16. The diagonal of a cube is $4\sqrt{3}$ cm. Find its volume. [1]
- Q17. In an experiment a coin is tossed 200 times. If the head turns up 120 times, then find the experimental probability of getting a head. [1]
- Q18. Find a rational number between 8 and 9. [1]

OR

Find the value of $(256)^{0.6} \times (256)^{0.09}$

- Q19. Find the distance of point S $(-3, 6)$ from y -axis. [1]
- Q20. In a grouped frequency distribution, the class intervals are 1-10, 11-20, 21-30, Find the class width. [1]

SECTION B

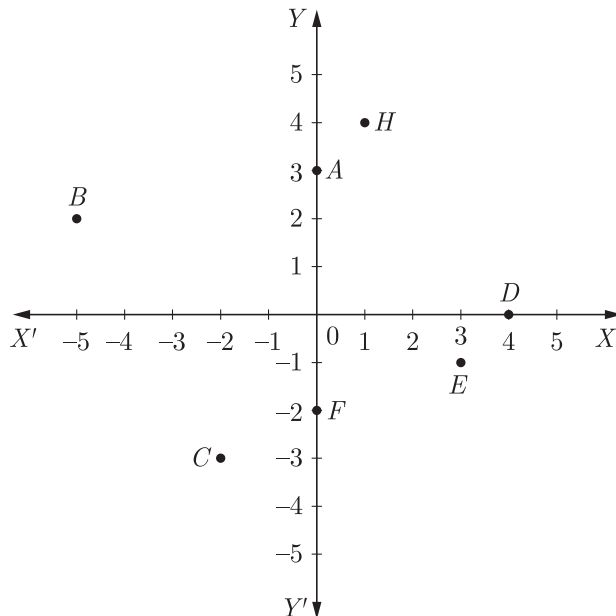
- Q21. If $x = 9 - 4\sqrt{5}$, find the value of $x^2 + \frac{1}{x^2}$. [2]

OR

Prove that $\frac{1}{2+\sqrt{3}} + \frac{2}{\sqrt{5}-\sqrt{3}} + \frac{1}{2-\sqrt{5}} = 0$

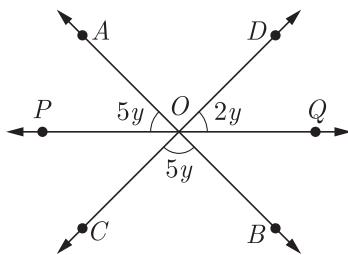
Q22. Given the equation of three lines passing through $(4, -5)$. How many more such lines are there and why ? [2]

Q23. From the figure, write the following : [2]



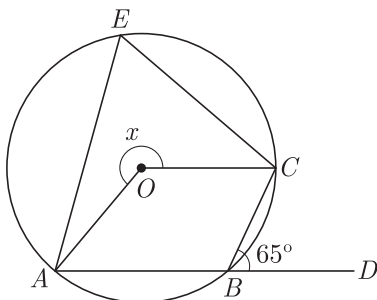
- Coordinates of B , C and E
- The point identified by the coordinates $(0, -2)$
- The abscissa of the point H
- The ordinates of the point D .

Q24. In the given figure, AB , CD and PQ are three lines concurrent at O . If $\angle AOP = 5y$, $\angle QOD = 2y$ and $\angle BOC = 5y$, then find the value of y . [2]

**OR**

If ray OC stands on line AB such that $\angle AOC = \angle COB$, then show that $\angle AOC = 90^\circ$.

Q25. If O is the centre of the circle, then find the value of x in the given figure. [2]



Q26. A conical tent is to accommodate 11 persons. Each person must have 4 sq m of the space on the ground and 20 cubic metre of air to breathe. Find the height of the cone. [2]

OR

The diameter of a roller, 120 cm long is 84 cm. It takes 500 complete revolutions to level a playground. Find the cost of levelling it at the rate of ₹ 25 per sq metre.

SECTION C

Q27. (i) Without actually calculating the cubes, find the value of $48^3 - 30^3 - 18^3$.

(ii) Without finding the cubes, factorise $(x - y)^3 + (y - z)^3 + (z - x)^3$ [3]

OR

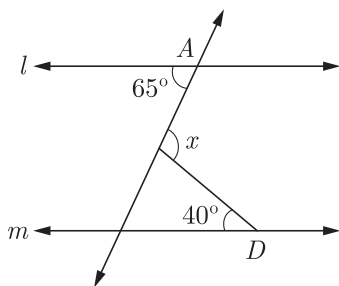
Find the value of k , if $x + k$ is the factor of the polynomials :

(i) $x^3 + kx^2 - 2x + k + 5$

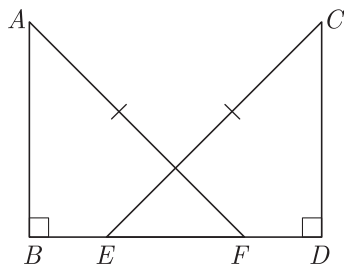
(ii) $x^4 - k^2x^2 + 3x - 6k$

Q28. Prove that through a given point, we can draw only one perpendicular to a given line. [3]

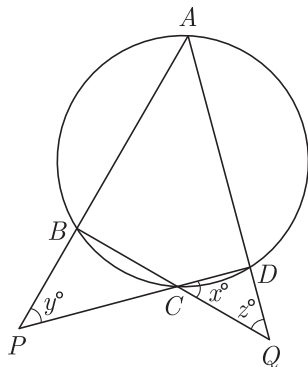
Q29. In the given figure, if $l \parallel m$, then find the value of x . [3]



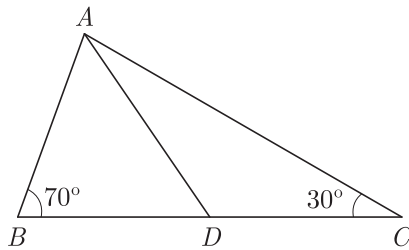
Q30. In the given figure, AB and CD are perpendiculars on BD . Also, $AB = CD$ and $AF = CE$. Prove that $BE = FD$. [3]



Q31. In the given figure, if $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$, then calculate the values of x , y and z . [3]



Q32. In the given figure AD bisects $\angle A$. Then, find the relation between the sides AB , AC and DC . [3]



- Q33. A copper sphere of diameter 18 cm is drawn into a wire of diameter 4 mm. Find the length of the wire. [3]

OR

The volume of a right circular cone is 9856 cm^3 . If the diameter of the base is 28 cm, find

- (i) height of the cone
- (ii) slant height of the cone
- (iii) curved surface area of the cone

- Q34. Probability of getting a blue ball is $\frac{2}{3}$, from a bag containing 6 blue and 3 red balls. 12 red balls are added in the bag, then find the probability of getting :

- (i) a blue ball
- (ii) a red ball

[3]

OR

Over the past 200 working days, the number of defective parts produced by a machine is given below :

No. of defective parts	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Days	50	32	22	18	12	12	10	10	10	8	6	6	2	2

Determine the probability that tomorrow's output will have :

- (i) no defective part
- (ii) not more than 5 defective parts
- (iii) more than 13 defective parts ?

SECTION D

- Q35. Using factor theorem, factorise $x^3 - 6x^2 + 3x + 10$. [4]

OR

If $ab + bc + ca = 0$, find the value of

$$\frac{1}{a^2 - bc} + \frac{1}{b^2 - ca} + \frac{1}{c^2 - ab}.$$

- Q36. If $2^x = 3^y = 6^z$, prove that $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 0$ or $z = \frac{xy}{x+y}$. [4]

- Q37. In countries like USA and Canada, temperature is measured in Fahrenheit, whereas in countries like India, it is measured in Celsius. Here is a linear equation that converts Fahrenheit to Celsius : [4]

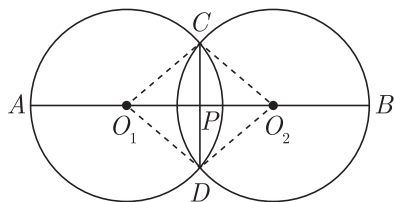
$$F = \left(\frac{9}{5}\right)C + 32$$

- (i) Draw the graph of the linear equation above using Celsius for x -axis and Fahrenheit for y -axis.
- (ii) If the temperature is 30°C , what is the temperature in Fahrenheit ?
- (iii) If the temperature is 95°F , what is the temperature in Celsius ?
- (iv) If the temperature is 0°C , what is the temperature in Fahrenheit and if the temperature is 0°F , what is the temperature in Celsius ?

- Q38. Prove that if any two chords of a circle are drawn, then one which is nearer to the centre, is larger. [4]

OR

O_1 and O_2 are the centres of two congruent circles intersecting each other at points C and D . The line joining their centres intersects the circles in points A and B such that $AB > O_1O_2$. If $CD = 6 \text{ cm}$ and $AB = 12 \text{ cm}$, determine the radius of either circle.



Q39. Find the weight of a lead pipe 3.5 m long, if the external diameter of the pipe is 2.4 cm and the thickness of the lead is 2 mm and 1 cu. cm of lead weights 11 g. [4]

Q40. Prove that $\sum_{i=1}^n (x_i - \bar{x}) = 0$, where \bar{x} is the mean of the n observations x_1, x_2, \dots, x_n . [4]

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CLASS IX (2019-20)
MATHEMATICS (041)
SAMPLE PAPER-08

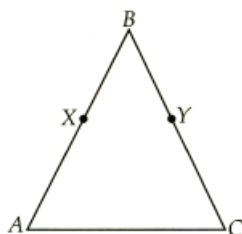
Time : 3 Hours**Maximum Marks : 80****General Instructions :**

- (i) All questions are compulsory.
- (ii) The questions paper consists of 40 questions divided into four 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 choices have 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.

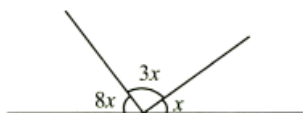
SECTION A

Q.1-Q.10 are multiple choice questions. Select the most appropriate answer from the given options.

- Q1. Which of the following statement is not true? [1]
 (a) Between two integers, there exist infinite number of rational numbers.
 (b) Between two rational numbers, there exist infinite number of integers
 (c) Between two rational numbers, there exist infinite number of rational numbers.
 (d) Between two real numbers, there exists infinite number of real numbers.
- Q2. Find the value of $x + y + z$ if $x^2 + y^2 + z^2 = 18$ and $xy + yz + zx = 9$ [1]
 (a) 9 (b) 3
 (c) 6 (d) 8
- Q3. Abscissa of $(2, 3)$ is [1]
 (a) -2 (b) 3
 (c) 2 (d) none of these
- Q4. $8y = 9$ when written as an equation in two variables, is [1]
 (a) $x + 8y = 9$ (b) $0 \cdot x + 8y + 9 = 0$
 (c) $0 \cdot x + 8y - 9 = 0$ (d) $0 \cdot x + 8y = 0$
- Q5. In the given figure, if $AB = BC$ and $BX = BY$, then [1]



- (a) $AX = CY$ (b) $AC = XY$
 (c) $AY = CX$ (d) none of these
- Q6. Calculate the value of x . [1]



- (a) 270° (b) 70°
 (c) 15° (d) 45°

Q7. In $\triangle ABC$, if $\angle C > \angle B$, then [1]

- (a) $BC > AC$ (b) $AB > AC$
 (c) $AB < AC$ (d) $BC < AC$

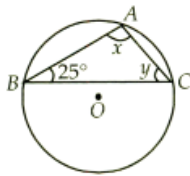
Q8. In a parallelogram $ABCD$, $\angle A = 115^\circ$. The measure of $\angle D$ is equal to [1]

- (a) 115° (b) 65°
 (c) 135° (d) 165°

Q9. Area of an isosceles triangle, the measure of one of its equal side being 5 cm and the third side 4 cm is [1]

- (a) $2\sqrt{21} \text{ cm}^2$ (b) $21\sqrt{2} \text{ cm}^2$
 (c) $22\sqrt{3} \text{ cm}^2$ (d) $23\sqrt{3} \text{ cm}^2$

Q10. In the given figure, O is the centre of the circle. For what values of x and y , chord BC will pass through the centre of circle where points A , B and C are on the circle? [1]



- (a) $x = 90^\circ, y = 60^\circ$
 (b) $x = 75^\circ, y = 30^\circ$
 (c) $x = 65^\circ, y = 90^\circ$
 (d) $x = 90^\circ, y = 65^\circ$

(Q.11-Q.15) Fill in the blanks :

Q11. If the lengths of two sides of an isosceles triangle are 4 cm and 10 cm, then the length of the third side is cm. [1]

Q12. An isosceles right-angled triangle has an area 8 cm^2 . The value of perimeter of triangle is cm. [1]

OR

If height of a triangle is halved then its area will become of original area.

Q13. The solid bounded by two concentric spherical surfaces is called a [1]

Q14. The is the difference between the greatest and the least value of the variate. [1]

Q15. An for an experiment is the collection of some outcomes of the experiment. [1]

(Q.16-Q.20) Answer the following :

Q16. Find the zero of a polynomial $2x + 4$. [1]

Q17. Are there any points which do not lie in any of the quadrants? If yes, where do they lie? [1]

Q18. If a point C lies between two points A and B such that $AC = BC$, then prove that $AC = AB/2$, explaining by drawing the figure. [1]

Q19. If the sides of an equilateral triangle are tripled, then find its new area. [1]

Q20. Give an example of data that you collect from your day-to-day life. [1]

SECTION B

- Q21. Simplify : $\frac{6}{3\sqrt{2} - 2\sqrt{3}}$. [2]

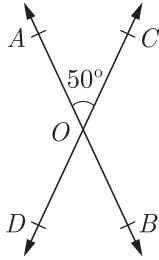
OR

If $\frac{\sqrt{3}-1}{\sqrt{3}+1} = a + b\sqrt{3}$, find the value of a and b .

- Q22. If one angle is equal to four times of its complement. Find the angle. [2]

OR

In the given figure, if $\angle AOC = 50^\circ$, then find $(\angle AOD + \angle COB)$.

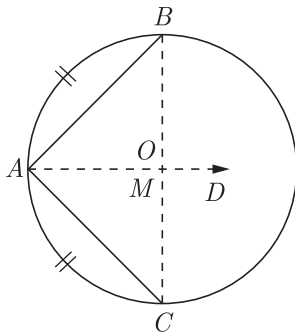


- Q23. Express y in terms of x , given that $2x - 5y = 7$. Check whether the point $(-3, -2)$ is one the given line. [2]

- Q24. Find the coordinates of the point : [2]

- (i) Which lies on x and y axes both.
- (ii) Whose abscissa is 2 and which lies on the x -axis.

- Q25. AB and AC are two equal chords of a circle. Prove that the bisector of the $\angle BAC$ passes through the centre of the circle. [2]



- Q26. The areas of three adjacent faces of a cuboid are x , y and z . If its volume is V , then find its volume. [2]

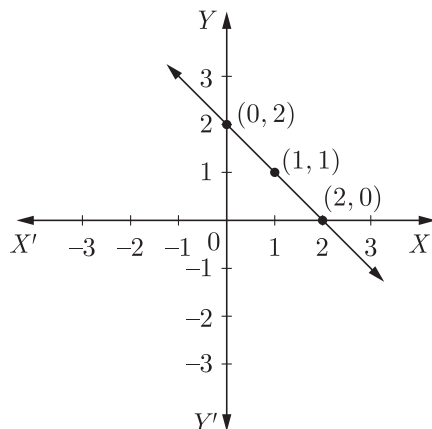
OR

The curved surface area of a right circular cylinder of height 14 cm is 88 cm^2 . Find the diameter of the base of the cylinder.

SECTION C

- Q27. From the choices given below, choose the equation whose graph is shown in the figure. [3]

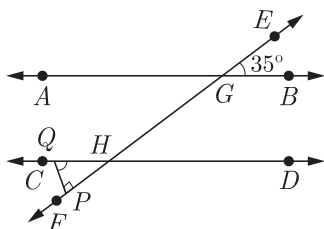
- (i) $x + y = 2$
- (ii) $x - y = 2$
- (iii) $2x + 2y = 6$



OR

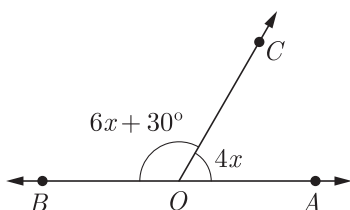
Draw the graph of $3x - 2y = 0$.

- Q28. In the given figure, $AB \parallel CD$ and EF is a transversal, which intersects them at G and H , respectively. If $\angle EGB = 35^\circ$ and $QP \perp EF$, then find $\angle PQH$. [3]

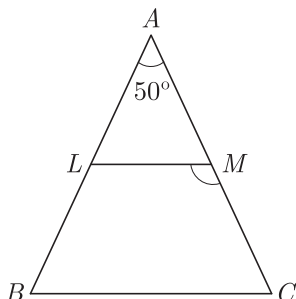


OR

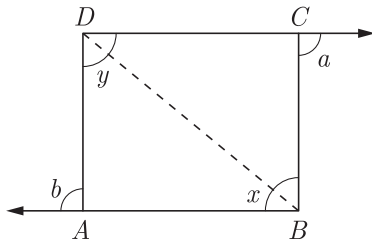
What value of x would make AOB a line in figure, if $\angle AOC = 4x$ and $\angle BOC = 6x + 30^\circ$?



- Q29. In the given figure, $\triangle ABC$ is an isosceles triangle in which $AB = AC$ and LM is parallel to BC . If $\angle A = 50^\circ$, find $\angle LMC$. [3]



- Q30. Show that if two sides of a triangle are of lengths 5 cm and 1.5 cm, then the length of third side of the triangle cannot be 3.4 cm. [3]
- Q31. The sides BA and DC of a quadrilateral $ABCD$ are produced as shown in figure. [3]



Prove that $a + b = x + y$.

Q32. Show that a median of a triangle divides it into two triangles of equal areas. [3]

Q33. The sides of a triangle are x , $x + 1$, $2x - 1$ and its area is $x\sqrt{10}$. Find the value of x . [3]

OR

The diameters of two cones are equal. If their slant heights are in the ratio 5 : 4, then find the ratio of their curved surface areas.

Q34. Here is an extract from a mortality table. [3]

Age (in years)	Number of persons surviving out of a sample of one million
60	16090
61	11490
62	8012
63	5448
64	3607
65	2320

- (i) Based on this information, what is the probability of a person 'aged 60' of dying within a year ?
 (ii) What is the probability that a person 'aged 61' will live for 4 years ?

SECTION D

Q35. Rationalise : $\frac{1}{\sqrt{7} + \sqrt{3} - \sqrt{2}}$. [4]

Q36. Factorise : $x^2 + \frac{1}{x^2} + 2 - 2x - \frac{2}{x}$. [4]

Q37. A part of monthly expenses of a family on milk is fixed which is ₹ 500 and the remaining varies with the quantity of milk taken extra at the rate of ₹ 20 per litre. Taking the quantity of milk required extra x litre and the total expenditure on milk is ₹ y , write a linear equation for this information and draw its graph. [4]

Q38. Construct $\triangle ABC$ in which $BC = 6.8$ cm, $\angle B = 45^\circ$ and $\angle C = 45^\circ$. Construct angle bisector of $\angle B$ and $\angle C$ and let them intersect at point O . Measure $\angle BOC$. [4]

Q39. The diameter of the Moon is approximately one-fourth of the diameter of the Earth. Find the ratio of their surface areas. [4]

OR

The total cost of making a spherical ball is ₹ 33,957 at the rate of ₹ 7 per cubic metre. What will be the radius of this ball ?

Q40. A study on cost of living index for a particular year in a city, the following weekly observations were made. [4]

Cost of living index (₹)	Number of weeks
140-150	5
150-160	10
160-170	20
170-180	9

180-190	6
190-200	2

Draw a histogram and a frequency polygon on the same scale.

OR

Following are the runs scored by two teams A and B in a 10 over match. Represent the data graphically on the same graph.

Over	Team A	Team B
1	2	5
2	1	6
3	8	2
4	9	10
5	4	5
6	5	6
7	6	3
8	10	4
9	6	8
10	2	10

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CLASS IX (2019-20)
MATHEMATICS (041)
SAMPLE PAPER-09

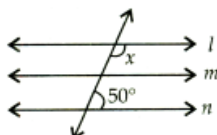
Time : 3 Hours**Maximum Marks : 80****General Instructions :**

- (i) All questions are compulsory.
- (ii) The questions paper consists of 40 questions divided into four 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 choices have 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

Q.1-Q.10 are multiple choice questions. Select the most appropriate answer from the given options.

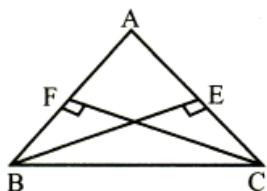
- Q1. Four rational numbers between 3 and 4 are: [1]
- (a) $\frac{3}{5}, \frac{4}{5}, 1, \frac{6}{5}$ (b) $\frac{13}{5}, \frac{14}{5}, \frac{16}{5}, \frac{17}{5}$
- (c) 3.1, 3.2, 4.1, 4.2 (d) 3.1, 3.2, 3.8, 3.9
- Q2. In the method of factorisation of an algebraic expression, which of the following statement is false? [1]
- (a) Taking out a common factor from two or more terms.
- (b) Taking out a common factor from a group of terms.
- (c) Using remainder theorem.
- (d) Using standard identities.
- Q3. If the coordinates of the point P are $(3, -5)$ then the perpendicular distance of P from the y -axis. [1]
- (a) 4 (b) 5
- (c) 3 (d) 2
- Q4. The graph of $y = 6$ is a line [1]
- (a) parallel to x -axis at a distance 6 units from the origin
- (b) parallel to y -axis at a distance 6 units from the origin
- (c) making an intercept 6 on the x -axis
- (d) making an intercept 6 on both the axes
- Q5. For every line l and for every point P (not on l), there does not exist a unique line through P [1]
- (a) Which is not parallel to l .
- (b) Which is perpendicular to l .
- (c) Which is coincident with l .
- (d) None of these
- Q6. In figure, if $l \parallel m$, $m \parallel n$, then $x =$ [1]



- (a) 130° (b) 140°
- (c) 120° (d) 154°

Q7. In the given figure if $BE = CF$, then

[1]



- (a) $\triangle ABE \cong \triangle ACF$ (b) $\triangle ABE \cong \triangle AFC$
 (c) $\triangle ABE \cong \triangle CAF$ (d) $\triangle AEB \cong \triangle AFC$

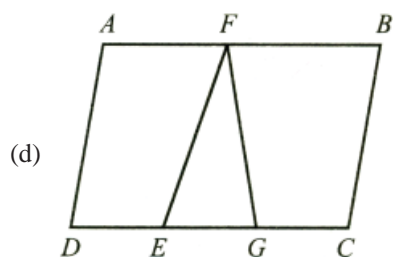
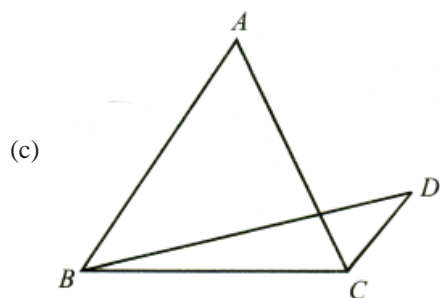
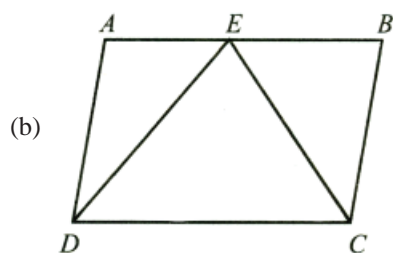
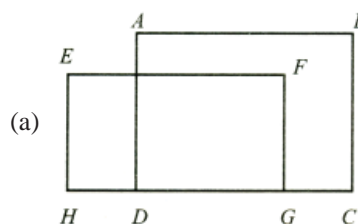
Q8. The angles of a quadrilateral are in the ratio $1 : 2 : 3 : 4$. The largest angle is

[1]

- (a) 36° (b) 72°
 (c) 108° (d) 144°

Q9. Which of the following figures lie on the same base and between the same parallels?

[1]



Q10. Diagonals of a cyclic quadrilateral are the diameters of that circle, then quadrilateral is a

[1]

- (a) parallelogram (b) square
 (c) rectangle (d) trapezium

(Q.11-Q.15) Fill in the blanks :

Q11. The construction of a triangle ABC , given that $BC = 6$ cm, $\angle B = 45^\circ$ is not possible when difference of AB and AC is equal to cm

[1]

Q12. If the perimeter of an equilateral triangle is 90 m, then its area is m^2 . [1]

OR

If base of a triangle is doubled then its area will be times of original area.

Q13. Volume of a cylinder is three times the volume of a on the same base and of the same height. [1]

Q14. Width of the class-interval is called of class interval. [1]

Q15. Probability is a measure of [1]

(Q.16-Q.20) Answer the following :

Q16. Find a rational number between -5 and -6 . [1]

Q17. Find the zero of a polynomial $2x + 4$ [1]

Q18. Find the image of point $(-4, 6)$ under origin. [1]

Q19. One side of an equilateral triangle is 4 cm Find its area. [1]

Q20. Is it correct to say that in a histogram, the area of each rectangle is proportional to the class size of the corresponding class interval? If not, correct the statement. [1]

SECTION B

Q21. Find the value of x , $2^{7x} \div 2^{2x} = \sqrt[5]{2^{15}}$. [2]

OR

If $x = \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$, then find the value of x^2 .

Q22. Write linear equation such that each point on its graph has ordinate 3 times its abscissa. [2]

Q23. In which quadrant does the given point lie ? [2]

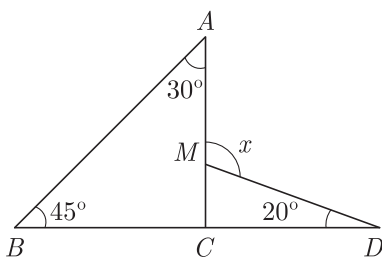
(i) $A(4, -3)$

(ii) $B(-2, 5)$

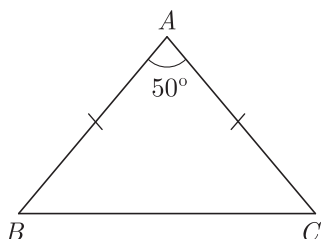
(iii) $C(-3, -2)$

(iv) $D(2, 4)$

Q24. In the given figure, find the value of x . [2]

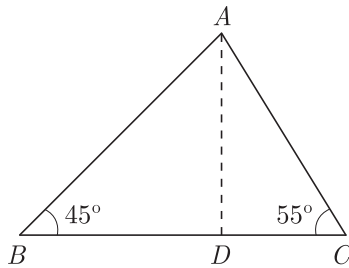


Q25. In a $\triangle ABC$ if $AB = 3$ cm, $AC = 3$ cm and $\angle A = 50^\circ$, then find $\angle B$. [2]



OR

In a triangle ABC , $\angle B = 45^\circ$, $\angle C = 55^\circ$ and bisector of $\angle A$ meets BC at a point D . Find $\angle ADB$ and $\angle ADC$.



- Q26. A cuboidal water tank is 8 m long, 6 m wide and 3 m deep. How many litres of water can it hold ? [2]

OR

The circumference of the base of a cylindrical vessel is 132 cm and its height is 25 cm. How many litres of water can it hold ? ($1000 \text{ cm}^3 = 1 \text{ l}$)

SECTION C

- Q27. If $x - y = 5$ and $xy = 84$, find the value of $x^3 - y^3$. [3]

OR

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

- Q28. If a line is drawn parallel to base of isosceles triangle to intersect its equal sides, then prove that quadrilateral so formed is cyclic. [3]

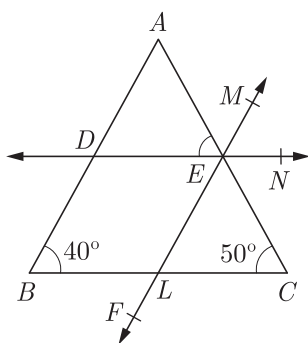
- Q29. The perimeter of an isosceles triangle is 32 cm and its base is 12 cm. One of its equal sides forms the diagonal of a parallelogram. Find the area of a parallelogram. [3]

OR

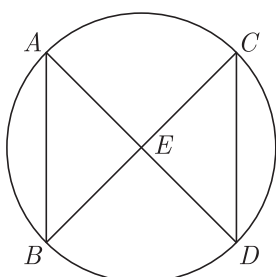
D and E are the mid-points of BC and AD respectively of $\triangle ABC$. If area of $\triangle ABC = 20 \text{ cm}^2$, find area of $\triangle EBD$.

- Q30. In the given figure, $DE \parallel BC$ and $MF \parallel AB$. Find : [3]

- (i) $\angle ADE + \angle MEN$
- (ii) $\angle BDE$
- (iii) $\angle BLE$



- Q31. In figure, $AB = CD$. Prove that $BE = DE$ and $AE = CE$, where E is the point of intersection of AD and BC . [3]



Q32. Construct a triangle ABC in which $BC = 7$ cm, $\angle B = 75^\circ$ and $AB + AC = 13$ cm. [3]

Q33. The volume of a cylinder is 448π cm³ and height is 7 cm. Find its lateral surface area and total surface area. [3]

OR

The largest sphere is carved out of a cube of side 7 cm. Find the volume of the sphere.

Q34. Probability of getting a blue ball is $\frac{2}{3}$, from a bag containing 6 blue and 3 red balls. 12 red balls are being added in the bag, then find the probability of getting a blue ball. [3]

SECTION D

Q35. If $\frac{\sqrt{7}-1}{\sqrt{7}+1} - \frac{\sqrt{7}+1}{\sqrt{7}-1} = a + b\sqrt{7}$, find the values of a and b . [4]

Q36. Factorise : [4]

$$(a+b)^3 - (b+c)^3 + (c+a)^3 + 3(a+b)(b+c)(c+a)$$

OR

If $a + b + c = 0$, then prove that $\frac{(b+c)^2}{3bc} + \frac{(c+a)^2}{3ac} + \frac{(a+b)^2}{3ab} = 1$

Q37. The cost of a shirt of a particular brand is ₹ 1000. Write a linear equation, when the cost of x shirts is ₹ y . Draw the graph of this equation and find the cost of 12 such shirts from the graph. [4]

Q38. Construct a triangle ABC in which $BC = 5.8$ cm, $\angle B = 45^\circ$ and $\angle C = 60^\circ$. Construct angle bisectors of $\angle B$ and $\angle C$ and intersect them at point O . Measure $\angle BOC$. [4]

Q39. The outer diameter of a spherical shell is 10 cm and the inner diameter is 9 cm. Find the volume of the metal contained in the shell. (Use $\pi = \frac{22}{7}$) [4]

Q40. The runs scored by two teams A and B on the first 60 balls in a cricket match are given below : [4]

Number of balls	Team A	Team B
1 - 6	2	5
7 - 12	1	6
13 - 18	8	2
19 - 24	9	10
25 - 30	4	5
31 - 36	5	6
37 - 42	6	3
43 - 48	10	4
49 - 54	6	8
55 - 60	2	10

Represent the data of both the teams on the same graph by frequency polygons.

OR

Draw a histogram and frequency polygon on the same graph for the following data.

Class interval	Frequency
150 - 200	5
200 - 250	3
250 - 300	5
300 - 350	6
350 - 400	8
400 - 450	7
450 - 500	1

CLASS IX (2019-20)
MATHEMATICS (041)
SAMPLE PAPER-10

Time : 3 Hours**Maximum Marks : 80****General Instructions :**

- (i) All questions are compulsory.
- (ii) The questions paper consists of 40 questions divided into four 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 choices have 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.

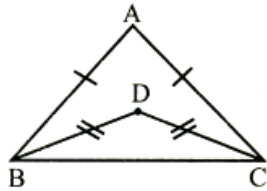
SECTION A

Q.1-Q.10 are multiple choice questions. Select the most appropriate answer from the given options.

- Q1. A rational number equivalent to a rational number $\frac{7}{19}$ is [1]
(a) $\frac{17}{119}$ (b) $\frac{14}{57}$
(c) $\frac{21}{38}$ (d) $\frac{21}{57}$
- Q2. If $x = -2$ and $x^2 + y^2 + 3xy = -5$, then find [1]
(a) -2 (b) 3
(c) -4 (d) 9
- Q3. A point whose abscissa is -3 and ordinate is 2 lies in [1]
(a) first quadrant (b) second quadrant
(c) third quadrant (d) fourth quadrant
- Q4. If $(3, -2)$ is a solution of the equation $3x - py - 7 = 0$, then the value of p is [1]
(a) -1 (b) 1
(c) $-\frac{13}{3}$ (d) 2
- Q5. Two distinct lines [1]
(a) always intersect.
(b) always either intersect or are parallel.
(c) always have two common points.
(d) are always parallel.
- Q6. Find the value of x . [1]

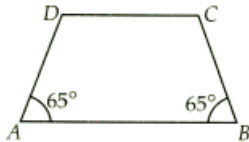


- (a) 70° (b) 75°
(c) 60° (d) 65°
- Q7. In the given figure, the ratio $\angle ABD : \angle ACD$ is [1]



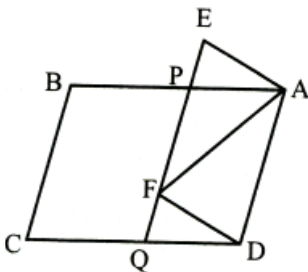
- (a) 1 : 1 (b) 2 : 1
(c) 1 : 2 (d) 2 : 3

Q8. In the given figure $AB \parallel CD$, then measure of $\angle C$ is [1]



- (a) 65° (b) 115°
(c) 135° (d) 125°

Q9. In figure $ABCD$ and $AEFD$ are two parallelograms, then the ratio of $\text{ar}(\triangle PEA)$ to the $\text{ar}(\triangle QFD)$. [1]



- (a) 1 : 4 (b) 1 : 3
(c) 1 : 2 (d) 1 : 1

Q10. The line joining the centre of a circle to the midpoint of a chord is always [1]

- (a) parallel to the chord
(b) perpendicular to the chord
(c) equal to the chord
(d) tangent to the chord

(Q.11-Q.15) Fill in the blanks :

- Q11. The construction of a triangle ABC , given that $BC = 3$ cm, $\angle C = 60^\circ$ is possible when difference of AB and AC is equal to cm. [1]
- Q12. The value of semi-perimeter of an equilateral triangle having area $4\sqrt{3}$ cm² is cm. [1]

OR

Area of a triangle with perimeter 42 cm and length of two sides 18 cm and 10 cm is given by

- Q13. The volume of a sphere is to two-thirds the volume of a cylinder of the same height and diameter. [1]
- Q14. The range of the data 15, 20, 6, 5, 30, 35, 93, 34, 91, 17, 83, is [1]
- Q15. An experiment is called a experiment if all the possible outcomes are pre-decided. [1]

(Q.16-Q.20) Answer the following :

- Q16. Find the coefficient of x^2 in $(3x + x^3)\left(x\frac{1}{x}\right)$ [1]

- Q17. In which quadrant $(6, -4)$ will lie? [1]
- Q18. Euclid divided the 'elements' into how many books? [1]
- Q19. Find the area of right triangle in which the sides containing the right angle measure 20 cm and 15 cm [1]
- Q20. What is the mean of prime numbers between 20 and 30. [1]

SECTION B

- Q21. Find the value of $\frac{6}{\sqrt{5} - \sqrt{3}}$, if $\sqrt{3} = 1.732$ and $\sqrt{5} = 2.236$. [2]

OR

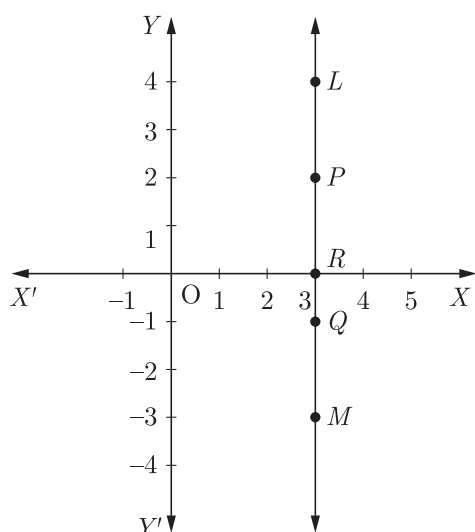
Simplify : $\frac{8(5\sqrt{2} + 1)}{(\sqrt{2} + 1)^2 - (\sqrt{2} - 1)^2}$ and express as rational denominator.

- Q22. Find the value of k for the given below equation if $x = 1$ and $y = 1$ is its solution. $9kx + 12ky = 63$ [2]

OR

Show that $x + 3$ is a factor of $69 + 11x - x^2 + x^3$.

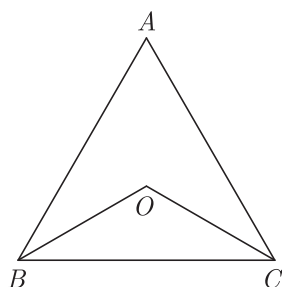
- Q23. In the figure, LM is a line parallel to the y -axis at a distance of 3 units.
 (i) What are the coordinates of P , R and Q ?
 (ii) What is the difference between the abscissa of the points L and M ? [2]



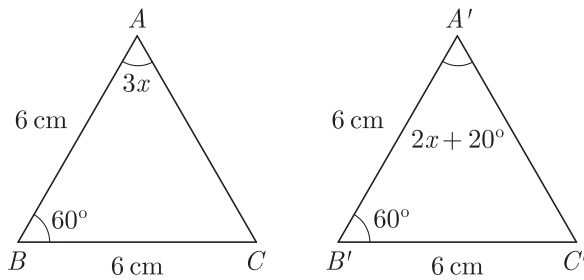
- Q24. Find the supplement of $\frac{3}{5}$ of a right angle. [2]

OR

In the given figure, ABC is an equilateral triangle. The bisectors of $\angle ABC$ and $\angle ACB$ meet at O . Find the measure of $\angle BOC$.



- Q25. In the given figure, find the measure of $\angle B'A'C'$. [2]



- Q26. The diameters of two cones are equal. If their slant heights are in the ratio 5 : 4, then find the ratio of their curved surface areas. [2]

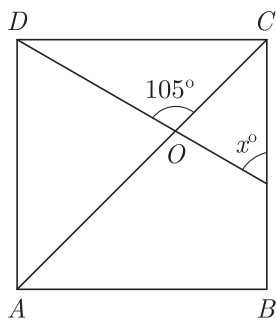
SECTION C

- Q27. The linear equation that converts Fahrenheit (F) to Celsius (C), is given by the relation $C = \frac{5F - 160}{9}$. [3]
- (i) If the temperature is 86°F , then what is the temperature in Celsius ?
- (ii) If the temperature is 35°C , then what is the temperature in Fahrenheit ?
- (iii) If the temperature is 0°C , then what is the temperature in Fahrenheit and if temperature is 0°F , then what is the temperature in Celsius ?

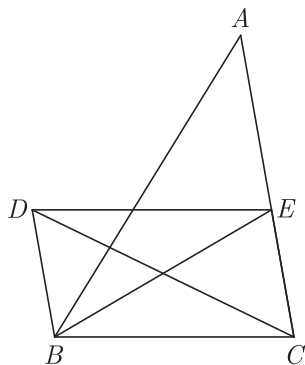
OR

Solve : $4x - 18 = 3y$, $6x + 7y - 4 = 0$.

- Q28. Prove that, if a transversal intersects two lines, such that pair of alternate interior angles is equal, then the two lines are parallel. [3]
- Q29. In the adjacent figure, $ABCD$ is a square. A line segment DX cuts the side BC at X and the diagonal AC at O , such that $\angle COD = 105^\circ$. Find the value of x . [3]



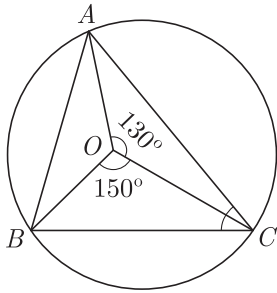
- Q30. In the given figure, $BD \parallel CA$, E is the mid-point of CA and $DB = \frac{1}{2}CA$. Prove that $ar(\triangle ABC) = 2 ar(\triangle DBC)$. [3]



OR

The medians BE and CF of a $\triangle ABC$ intersect at G . Prove that : $ar(\triangle GBC) = ar(\triangle FGE)$.

- Q31. ABC is a triangle inscribed in a circle with centre O . If $\angle AOC = 130^\circ$ and $\angle BOC = 150^\circ$, find $\angle ACB$. [3]



- Q32. Draw any exterior angle of a triangle and bisect it by using compass only. [3]
- Q33. The dimension of a rectangular box are in the ratio $2:3:4$ and the difference between the cost of covering it with sheet of paper at the rate of ₹ 4 and ₹ 4.50 per sq m is ₹ 416. Find the dimensions of the box. [3]

OR

A lead pencil consists of a cylinder of wood with a solid cylinder of graphite filled in the interior. The diameter of the pencil is 7 mm and the diameter of the graphite is 1 mm. If the length of the pencil is 14 cm, find the volume of the wood and that of the graphite.

- Q34. Cards marked with the numbers 2 to 101 are placed in a box and mixed thoroughly. One card is drawn from this box. Find the probability that the number on the card is a number which is a perfect square. The quick brown fox jumps over a little lazy dog. [3]

SECTION D

- Q35. Express $0.6 + 0.\bar{7} + 0.4\bar{7}$ in the form of $\frac{p}{q}$, where p and q are integers and $p \neq 0$. [4]

OR

Visualise the representation of $5.3\bar{7}$ using successive magnification upto 4 decimal places, that is up to 5.377.

- Q36. Find the square root of $(x^2 + 4x + 4)(x^2 + 6x + 9)$. [4]
- Q37. Draw the graph of linear equations $y = x$ and $y = -x$ on the same cartesian plane. Write your observation. [4]
- Q38. O is the centre of the $\triangle ABC$ and D is the mid-point of the base BC . Prove that $\angle BOD = \angle A$. [4]
- Q39. Volume of a right circular cone is $(\frac{2200}{7})\text{cm}^3$ and its diameter is 10 cm. Find its curved surface area. (Take $\pi = \frac{22}{7}$) [4]

OR

Solid sphere of diameter 4 cm are dropped into a cylindrical beaker containing some water and are fully submerged. If the diameter of the beaker is 12 cm and the water rises by 24 cm, find the number of solid spheres dropped in the water.

- Q40. Make a frequency polygon for given frequency table. [4]

Class-Interval	Frequency
0 - 5	2
5 - 10	3
10 - 15	4
15 - 20	1
20 - 25	5
25 - 30	3