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) $\dfrac{3}{5}, \dfrac{4}{5}, 1, \dfrac{6}{5}$ (b) $\dfrac{13}{5}, \dfrac{14}{5}, \dfrac{16}{5}, \dfrac{17}{5}$

(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]
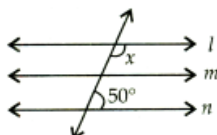
(a) $130°$ (b) $140°$
(c) $120°$ (d) $154°$

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Q7.   In the given figure if $BE = CF$, then   [1]
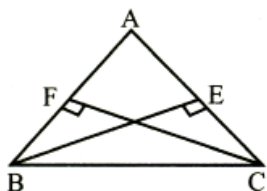
(a) $\triangle ABE \cong \triangle ACF$ (b) $\triangle ABE \cong \triangle AFC$

(c) $\triangle ABE \cong \triangle CAF$ (d) $\triangle AEB \cong \triangle AFC$
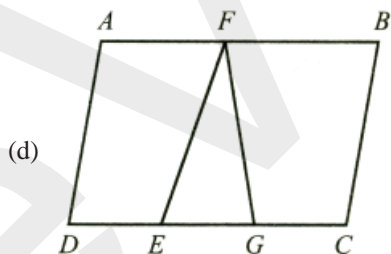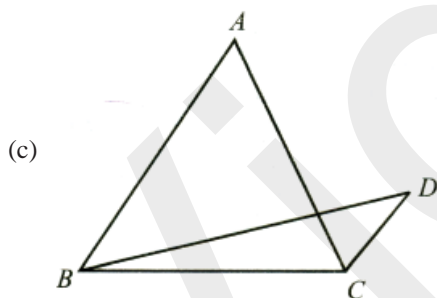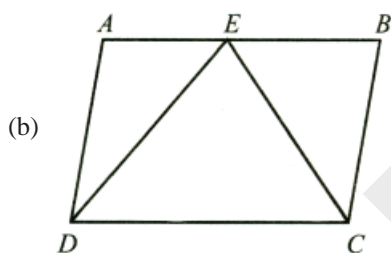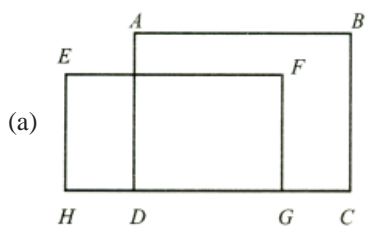
Q8.   The angles of a quadrilateral are in the ratio $1 : 2 : 3 : 4$. The largest angle is   [1]

(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]

(a)

(b)

(c)

(d)

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, $\angle B = 45°$ 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]
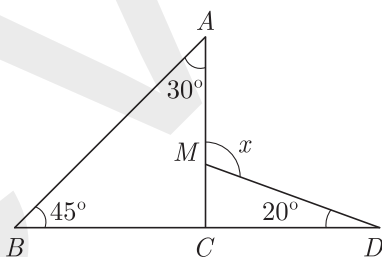
OR

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

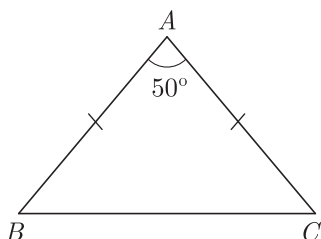Q22. Write linear equation such that each point on its graph has ordinate 3 times its abscissa.   [2]

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]
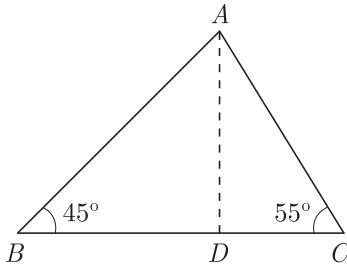

Q25. In a $\triangle ABC$ if $AB = 3$ cm, $AC = 3$ cm and $\angle A = 50°$, then find $\angle B$.   [2]

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OR

In a triangle ABC, $\angle B = 45°$, $\angle C = 55°$ 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 ? ($1000 \, \text{cm}^3 = 1 \, l$)

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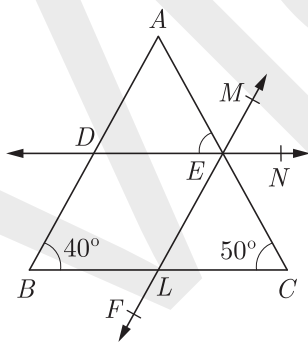
Q29.   The perimeter of an isosceles triangle is 32 cm and its base is 12 cm. One of its equal sides forms the diagonal of a parallelogram. Find the area of a parallelogram.   [3]
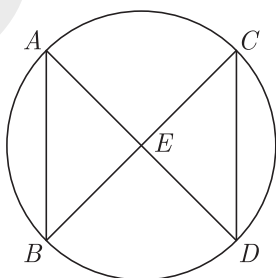
OR

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, $DE \, || \, BC$ and $MF \, || \, AB$. 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]

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

Q33.   The volume of a cylinder is 448π cm^3 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 $\dfrac{\sqrt{7}-1}{\sqrt{7}+1} - \dfrac{\sqrt{7}+1}{\sqrt{7}-1} = a + b\sqrt{7}$, 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 $\dfrac{(b+c)^2}{3bc} + \dfrac{(c+a)^2}{3ac} + \dfrac{(a+b)^2}{3ab} = 1$

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, $\angle B = 45°$ and $\angle C = 60°$. 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 $\pi = \dfrac{22}{7}$)   [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

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