

CLASS X (2019-20)
MATHEMATICS STANDARD(041)
SAMPLE PAPER-9

Time : 3 Hours

Maximum Marks : 80

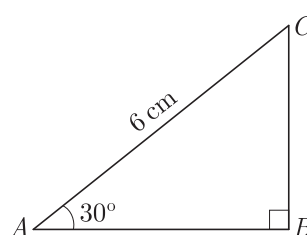
General Instructions :

- (i) All questions are compulsory.
- (ii) The questions paper consists of 40 questions divided into 4 sections A, B, C and D.
- (iii) Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.
- (iv) There is no overall choice. However, an internal 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 rational number have non-terminating repeating decimal expansion? [1]
 (a) $\frac{31}{3125}$ (b) $\frac{71}{512}$
 (c) $\frac{23}{200}$ (d) None of these
- Q2. If the sum of the zeroes of the polynomial $f(x) = 2x^3 - 3kx^2 + 4x - 5$ is 6, then the value of k is [1]
 (a) 2 (b) -2
 (c) 4 (d) -4
- Q3. A fraction becomes 4 when 1 is added to both the numerator and denominator and it becomes 7 when 1 is subtracted from both the numerator and denominator. The numerator of the given fraction is [1]
 (a) 2 (b) 3
 (c) 5 (d) 15
- Q4. $(x^2 + 1)^2 - x^2 = 0$ has [1]
 (a) four real roots (b) two real roots
 (c) no real roots (d) one real root
- Q5. An AP starts with a positive fraction and every alternate term is an integer. If the sum of the first 11 terms is 33, then the fourth term is [1]
 (a) 2 (b) 3
 (c) 5 (d) 6
- Q6. C is the mid-point of PQ , if P is $(4, x)$, C is $(y, -1)$ and Q is $(-2, 4)$, then x and y respectively are [1]
 (a) -6 and 1 (b) -6 and 2
 (c) 6 and -1 (d) 6 and -2
- Q7. In the adjoining figure, the length of BC is [1]



- (a) $2\sqrt{3}$ cm (b) $3\sqrt{3}$ cm

- (c) $4\sqrt{3}$ cm (d) 3 cm

- Q8. The volume of a largest sphere that can be cut from cylindrical log of wood of base radius 1 m and height 4 m, is [1]
 (a) $\frac{16}{3} \pi \text{ m}^3$ (b) $\frac{8}{3} \pi \text{ m}^3$
 (c) $\frac{4}{3} \pi \text{ m}^3$ (d) $\frac{10}{3} \pi \text{ m}^3$

- Q9. If the coordinates of the point of intersection of less than ogive and more than ogive is (13.5,20), then the value of median is [1]
 (a) 13.5 (b) 20
 (c) 33.5 (d) 7.5

- Q10. A three digit number is to be formed using the digits 3, 4, 7, 8 and 2 without repetition. The probability that it is an odd number is [1]
 (a) $\frac{2}{5}$ (b) $\frac{1}{5}$
 (c) $\frac{4}{5}$ (d) $\frac{3}{5}$

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

- Q11. theorem states that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. [1]
 Q12. Point on the X-axis which is equidistant from (2, - 5) and (- 2, 9) is [1]

OR

Relation between x and y if the points (x, y) , (1, 2) and (7, 0) are collinear is [1]

- Q13. Triangle in which we study trigonometric ratios is called [1]
 Q14. The common point of a tangent to a circle and the circle is called [1]
 Q15. Only two can be drawn to a circle from an external point. [1]

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

- Q16. A ladder, leaning against a wall, makes an angle of 60° with the horizontal. If the foot of the ladder is 2.5 m away from the wall, find the length of the ladder. [1]
 Q17. The diameter of two circle with centre A and B are 16 cm and 30 cm respectively. If area of another circle with centre C is equal to the sum of areas of these two circles, then find the circumference of the circle with centre C . [1]
 Q18. 12 solid spheres of the same size are made by melting a solid metallic cone of base radius 1 cm and height of 48 cm. Find the radius of each sphere. [1]

OR

Three cubes of iron whose edges are 3 cm, 4 cm and 5 cm respectively are melted and formed into a single cube, what will be the edge of the new cube formed ?

- Q19. In the following frequency distribution, find the median class. [1]

Height (in cm)	104-145	145-150	150-155	155-160	160-165	165-170
Frequency	5	15	25	30	15	10

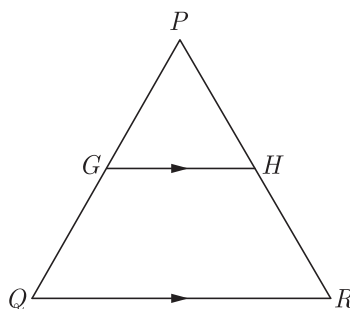
- Q20. A letter of English alphabet is chosen at random. Determine the probability that the chosen letter is a consonant. [1]

SECTION B

- Q21. Using Euclid’s algorithm, find the HCF of 240 and 228. [2]

Q22. Solve for x : $x^2 - (\sqrt{3} + 1)x + \sqrt{3} = 0$ [2]

Q23. In the given figure, G is the mid-point of the side PQ of ΔPQR and $GH \parallel QR$. Prove that H is the mid-point of the side PR or the triangle PQR . [2]



OR

In a rectangle $ABCD$, E is a point on AB such that $AE = \frac{2}{3}AB$. If $AB = 6$ km and $AD = 3$ km, then find DE .

Q24. A box contains 8 black beads and 12 white beads. Another box contains 9 black beads and 6 white beads. One bead from each box is taken. [2]

- (a) What is the probability that both beads are black?
- (b) What is the probability of getting one black bead and one white bead ?

Q25. The mean and median of 100 observation are 50 and 52 respectively. The value of the largest observation is 100. It was later found that it is 110. Find the true mean and median. [2]

OR

Find the sum of the lower limit of the median class and the upper limit of the modal class :

Classes	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	1	3	5	9	7	3

Q26. Due to sudden floods, some welfare associations jointly requested the government to get 100 tents fixed immediately and offered to contribute 50% of the cost. If the lower part of each tent is of the form of a cylinder of diameter 4.2 m and height 4 m with the conical upper part of same diameter but of height 2.8 m and the canvas to be used cost ₹ 100 per sq.m, find the amount, the associations will have to pay. [Use $\pi = \frac{22}{7}$] [2]

SECTION C

Q27. Find the HCF, by Euclid’s division algorithm of the numbers 92690, 7378 and 7161. [3]

OR

Find HCF and LCM of 16 and 36 by prime factorization and check your answer.

Q28. Solve for x : $\frac{1}{(x-1)(x-2)} + \frac{1}{(x-2)(x-3)} = \frac{2}{3}; x \neq 1, 2, 3$ [3]

Q29. The sum of n terms of an A.P. is $3n^2 + 5n$. Find the A.P. Hence find its 15th term. [3]

OR

Divide 56 in four parts in A.P. such that the ratio of the product of their extremes (1st and 4th) to the product of means (2nd and 3rd) is 5:6.

Q30. Two tangents TP and TQ are drawn to a circle with centre O from an external point T . Prove that $\angle PTO = \angle OPQ$ [3]

Q31. Three Students Priyanka, Sania and David are Protesting against killing innocent animals for commercial purposes in a circular park of radius 20 m. They are standing at equal distance on its boundary by holding banners in their hands. [3]
 (i) Find the distance between each of them?
 (ii) Which mathematical concept is used in it?

Q32. A 7 m long flagstaff is fixed on the top of a tower standing on the horizontal plane. From point on the ground, the angles

of elevation of the top and bottom of the flagstaff are 60° and 45° respectively. Find the height of the tower correct to one place of decimal. (Use $\sqrt{3} = 1.73$) [3]

OR

An aeroplane, when flying at a height of 4000 m from the ground passes vertically above another aeroplane at an instant when the angles of elevation of the two planes from the same point on the ground are 60° and 45° respectively. Find the vertical distance between the aeroplanes at that instant. (Use $\sqrt{3} = 1.73$)

Q33. A solid sphere of diameter 6 cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is 12 cm. If the sphere is completely submerged into water, by how much will the level of water rise in the cylindrical vessel ?

Q34. Hari, standing on the top of a building, sees the top of a tower at an angle of elevation of 50° and the foot of the tower at an angle of depression of 20° . Hari is 1.6 metre tall and the height of the building on which he is standing is 9.2 metres. [3]

(a) Draw a rough sketch according to the given information.

(b) How far is the tower from the building?

(c) Calculate the height of the tower.

[$\sin 20^\circ = 0.34$, $\cos 20^\circ = 0.94$, $\tan 20^\circ = 0.36$

$\sin 50^\circ = 0.77$, $\cos 50^\circ = 0.64$, $\tan 50^\circ = 1.19$]

SECTION D

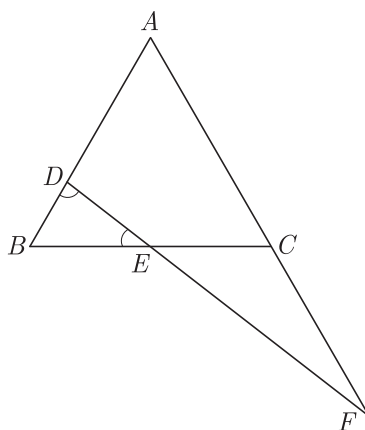
Q35. Show that 3 is a zero of the polynomial $2x^2 - x^2 - 13x - 6$. Hence find all the zeroes of this polynomial. [4]

OR

Given that $x - \sqrt{5}$ is a factor of the polynomial $x^3 - 3\sqrt{5}x^2 - 5x + 15\sqrt{5}$, find all the zeroes of the polynomial.

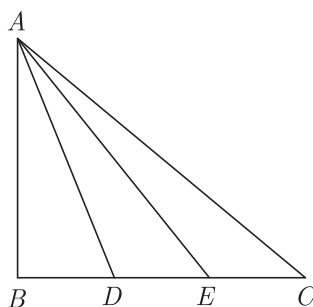
Q36. A train covered a certain distance at a uniform speed. If the train would have been 10 km/hr scheduled time. And, if the train were slower by 10 km/hr, it would have taken 3 hr more than the scheduled time. Find the distance covered by the train. [4]

Q37. In the figure, $\angle BED = \angle BDE$ and E is the mid-point of BC . Prove that $\frac{AF}{CF} = \frac{AD}{BE}$. [4]



OR

In the given figure, D and E trisect BC . Prove that $8AE^2 = 3AC^2 + 5AD^2$.



Q38. Evaluate : [4]

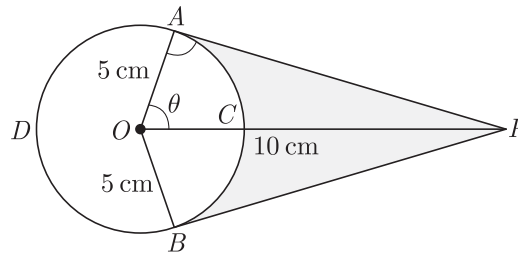
$$\sin^2 30^\circ \cos^2 45^\circ + 4 \tan^2 30^\circ + \frac{1}{2} \sin 90^\circ - 2 \cos^2 90^\circ + \frac{1}{24}$$

OR

Prove that : $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \tan \theta + \cot \theta.$

Q39. If $A(-4, 8)$, $B(-3, -4)$, $C(0, -5)$ and $D(5, 6)$ are the vertices of a quadrilateral $ABCD$, find its area. [4]

Q40. An elastic belt is placed around the rim of a pulley of radius 5 cm. From one point C on the belt elastic belt is pulled directly away from the centre O of the pulley until it is at P , 10 cm from the point O . Find the length of the belt that is still in contact with the pulley. Also find the shaded area. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$) [4]



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