

SAMPLE PAPER 1
SUBJECT: MATHEMATICS(Standard)
GRADE: X

Duration:3 hrs

Max Marks: 80

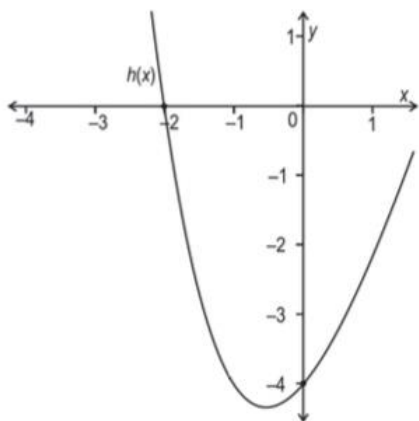
General Instructions:

1. This question paper has 5 sections A to E.
2. Section A has 20 MCQ carrying 1 mark each.
3. Section B has 5 questions carrying 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 4 questions carrying 5 marks each.
6. Section E has 3 case-based questions, 4 marks each.
7. In case an internal choice is given, attempt any one part.

Section A
MCQ-1 mark

1. If 3 coins are tossed once, what is the probability of getting all heads? 1
a) $\frac{3}{2}$ b) $\frac{1}{2}$ c) $\frac{1}{4}$ d) $\frac{1}{8}$
2. M and N are positive integers such that $M = p^2q^5r^3$ and $N = pq^4r^2$, the L.C.M (M and N) = 1
a) $p^3q^9r^5$ b) $p^2q^9r^5$ c) $p^2q^5r^5$ d) $p^2q^5r^3$
3. Abir correctly solves a pair of Linear Equations in two variables and found their only solution to be some point (h,k). One of the equations was $x - y = 5$. Which one of the following can be the other equation? 1
a) $3x - 3y = 15$ b) $2x - 3y = 15$
c) $2x - 2y = 15$ d) cannot be determined as value of h and k is unknown
4. $\tan A$ and $\tan B$ are roots of the quadratic equation, $abx^2 - cx + ab = 0$. What will be the value of $\tan A + \tan B$ 1
a) 0 b) 1 c) $\frac{c^2}{ab}$ d) not defined
5. If $k + 1 = \sec^2\theta(1 + \sin\theta)(1 - \sin\theta)$, then the value of k is 1
a) -1 b) 0 c) 2 d) 1

6. 1



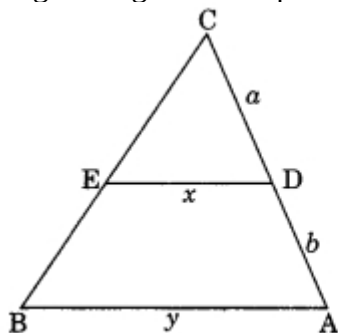
Given above is the graph of polynomial $h(x)$. On dividing $h(x)$, by which of the following linear factors, will we get zero as the remainder?

- a) $(x-2)$ b) $(x+4)$ c) $(x+2)$ d) none of these

7. If $\sqrt{3} \sin \beta - \cos \beta = 0$, then the value of β is 1

- a) 0° b) 30° c) 45° d) 60°

8. In the given figure DE is parallel to AC, which of the following is true? 1



- a) $\frac{x}{y} = \frac{a}{b}$ b) $x = \frac{by}{a+b}$ c) $y = \frac{ax}{a+b}$ d) $y = \frac{x(a+b)}{a}$

9. In a right triangle ABC, right-angled at C, $\tan A = 3/4$, then $\sin B$ equals to 1

- a) $\frac{4}{5}$ b) $\frac{3}{5}$ c) $\frac{4}{3}$ d) $\frac{3}{4}$

10. If in triangles ABC and DEF, $\frac{AB}{DE} = \frac{BC}{FD}$, then they will be similar, if 1

- a) $\angle B = \angle E$ b) $\angle A = \angle D$ c) $\angle B = \angle D$ d) $\angle A = \angle F$

11. Which of the following is true: 1

- a) Mode = 2 Median - 3 Mean b) Mode = Median - 2Mean
b) Mode = 3 Median - 2 Mean c) Mode = 2 Median - Mean

- 12 Three cubical warehouses of volume 165m^3 , 195m^3 , and 285m^3 are to be used for storage. What is the volume of the greatest cubical box that can be kept in the warehouse so that no space is left vacant? 1

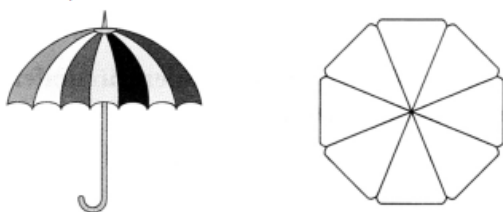
a) 6m^3 b) 15m^3 c) 5m^3 d) 3m^3

- 13 If $\cos y = 0$, then find the value of $\frac{1}{2} \cos \frac{y}{2}$ 1
- a) 0 b) 1 c) $\frac{1}{2}$ d) $\frac{1}{2\sqrt{2}}$

- 14 If the circumference of a circle and the perimeter of a square are equal, then 1

a) Area of the circle $= \frac{1}{2}$ Area of the square b) Area of the circle $>$ Area of the square
c) Area of the circle $<$ Area of the square d) Area of the circle $=$ Area of the square

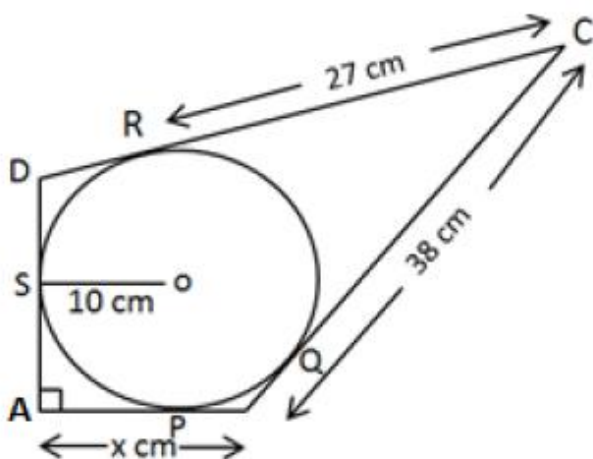
- 15 1



An umbrella has 8 ribs which are equally spaced. Assuming the umbrella to be a flat circle of radius 42cm, find the area between the two consecutive ribs of the umbrella.

a) 455cm^2 b) 693cm^2 c) 385cm^2 d) None of these

- 16 In the figure, quadrilateral ABCD is circumscribing a circle with centre O and $AD \perp AB$. If the radius of incircle is 10cm, then the value of x is 1



a) 9cm b) 10cm c) 19cm d) 21cm

17. The mean of 30 observations is 62. If each observation is multiplied by 5, then the new mean will be 1

- a) $62 + 5(30)$ b) 62 c) $62(5)$ d) $62(5)(30)$

18. A prime number has only two factors, 1 and the number itself. How many factors will the cube of a prime number have? 1

- a) 2 b) 4 c) 3 d) cannot be determined.

19. **Assertion(A):** D and E are points on the sides AB and AC respectively of a $\triangle ABC$ such that $DE \parallel BC$ then the value of x is 4, when $AD = x$ cm, $DB = (x - 2)$ cm, $AE = (x + 2)$ cm and $EC = (x - 1)$ cm. 1

Reason(R) : If a line is parallel to one side of a triangle then it divides the other two sides in the same ratio.

a) Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A).

b) Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A).

c) Assertion (A) is true and Reason (R) is false.

d) Assertion (A) is false and Reason (R) is true.

20. **Assertion(A):** The ordinate of point A on y-axis is 5 and B has coordinates (-3, 1). Then the length of AB is 5 units.

Reason(R): Any point on the perpendicular bisector of a line segment, is equidistant from the endpoints of the line segment.

a) Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A).

b) Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A).

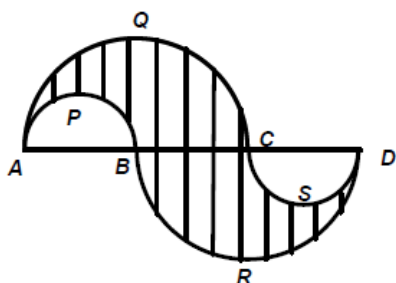
c) Assertion (A) is true and Reason (R) is false.

d) Assertion (A) is false and Reason (R) is true.

Section B

5 X 2 marks

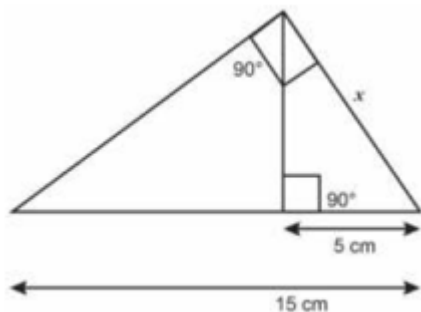
21. p and q are zeroes of a polynomial $2x^2+5x-4$. Without finding the actual p and q , find the value of $(1-p)(1-q)$ 2
22. APB, AQC, CSD, BRD are semicircles where $AB = BC = CD = 7\text{cm}$ (Use $\pi = \frac{22}{7}$). Find the perimeter of the shaded region. 2



23. Simran used the following step while solving the Quadratic Equation: $X = \frac{7 \pm \sqrt{169}}{10}$, find the equation that Simran was solving. 2
24. The perimeters of two similar triangles are 25cm and 15cm respectively. If one side of the first triangle is 9cm, find the length of the corresponding side of the second triangle. 2

OR

Two overlapping right triangles are shown below. Find x



25. Prove that the tangents drawn at the ends of a chord of circle make equal angles with the chord. 2
- OR**
- If from an external point P of a circle with centre O , two tangents PQ and PR are drawn such that $\angle QPR = 120^\circ$, prove that $2PQ = PO$.

Section C
6 X 3 marks

26. Draw the graph of $2x - y - 2 = 0$ and $4x + 3y - 24 = 0$ 3
- Find the area of the triangle formed by these lines and the y -axis

- 27 The algebraic expression, in the LHS of the equation, $x^2 - (5m-2)x + 4m^2 + 10m + 25 = 0$ is a perfect square. Find the value of m . 3

- 28 Given $\sqrt{7}$ is an irrational number, prove that $2\sqrt{7} - 5$ is also irrational. 3

OR

Prove $\sqrt{5}$ is irrational

- 29 From a well shuffled deck of 52 cards, one card is drawn at random. Find the probability of 3

i) Getting a black card or a Queen

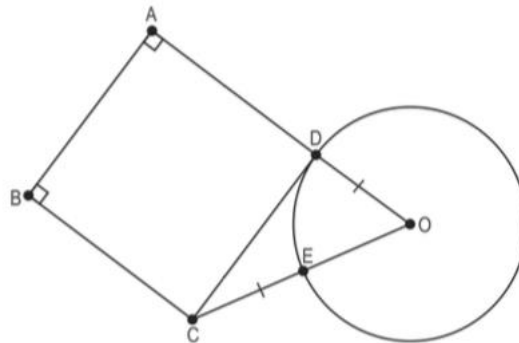
ii) Getting neither a black card nor a queen

OR

A box contains 12 balls of which some are red in colour. If 6 more red balls are added in the box and a ball is drawn at random, the probability of drawing a red ball doubles than what it was before. Find the number of red balls in the box.

- 30 Prove: $\frac{\cos A}{1 + \sin A} + \frac{1 - \sin A}{\cos A} = \frac{2 \cot A}{\operatorname{cosec} A + 1}$ 3

- 31 3



ABCD is a square, CD is a tangent to the circle with centre O as shown in the figure. If $OD = CE$, find the ratio of the area of the circle and the area of the square?

Section D 4 X 5 marks

- 32 A train travels 360km at a uniform speed. If the speed had been 5km/hr more, it would have taken 1 hour less for the same journey. Find the speed of train. 5

OR

To fill a swimming pool two pipes are to be used. If the pipe of larger diameter is used for 4 hours and the pipe of smaller diameter for 9 hours, only half the pool can be filled. Find how long it would take for each pipe to fill the pool separately, if pipe of smaller diameter takes 10 hours more than the pipe of larger diameter to fill the pool?

- 33 The ratio of the corresponding sides of two Similar Triangles is $x:y$. With proper working, find the ratio of their 5

a) Any one corresponding Median

b) Any one corresponding Altitude

- 34 Find the missing frequency x and y for the below data, if the median is 32. 5

Class	Frequency
0-10	10
10-20	x
20-30	25
30-40	30
40-50	y
50-60	10
total	100

- 35 Due to heavy floods in Chennai, thousands were rendered homeless. 50 schools collectively decided to provide place and the canvas for 1500 tents and share the whole expenditure equally. The lower part of each tent is cylindrical with base radius 2.8m and height 3.5m. Upper part is conical with the same base radius, but of height 2.1m. If the canvas used to make the tents cost Rs.120 per m^2 , find the amount shared by each school to set up tents. 5

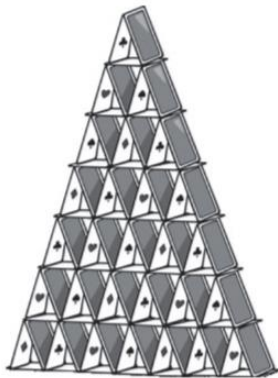
OR

There are two identical solid cubical boxes of side 7cm. From the top face of the first cube a hemisphere of diameter equal to the side of the cube is scooped out. This hemisphere is inverted and placed on the top of the second cubes's surface to form a dome. Find

- The ratio of the total surface area of the two new solids formed
- Volume of each new solid formed.

Section E
3 X 4 marks

36



1+1+
2

Shown above is House of cards, a structure created by stacking playing cards on top of each other in the shape of a pyramid.

Each small triangle is made using 3 cards and each layer has 1 less triangle than the layer below it.

1. Ankit is planning to build his house of cards, so that there are 3 cards in the top layer and 24 in the bottom layer. What will be the AP representing this situation?

2. How many rows of cards will be there as per Ankit's plan

3. If Priya is playing this game with 360 cards, how many layers can they make, if the top layer has 1 triangle.

