SEVEN SQUARE ACADEMY

Academic Year - 2019-2020
Secondary Section (Pre-Board I)

Name _____ **Subject: Maths (041)** **Date: 03/12/2020**

Class: X **SET - A** **Marks: 80** **Time: 3:00 Hours**

General Instructions:

1. All the questions are compulsory.
2. The question paper consists of 40 questions divided into 4 sections; A, B, C, D.
3. 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.
4. There is no overall choice. However, an internal choice has been provided in the paper.
5. Use of calculator is not permitted.

SECTION A

Q.1 to Q.10: Multiple choice questions, pick out the correct alternative: **[10× 1 = 10]**

1. If $\tan\theta = \frac{a}{x}$, then $\frac{x}{\sqrt{a^2+x^2}}$ =

i. $\cos\theta$ ii. $\sin\theta$ iii. $\operatorname{cosec}\theta$ iv. $\sec\theta$

2. Which of the following is a solution of the quadratic equation $2x^2 + x - 6 = 0$?

i. x=2 ii. X= -12 iii. X= $\frac{3}{2}$ iv. X= -3

3. The relationship between the zeroes (α and β) and coefficient of quadratic polynomial $ax^2 + bx + c$ is

i. $\alpha + \beta = \frac{c}{a}$ ii. $\alpha + \beta = -\frac{b}{a}$ iii. $\alpha + \beta = -\frac{c}{a}$ iv. $\alpha + \beta = \frac{b}{a}$

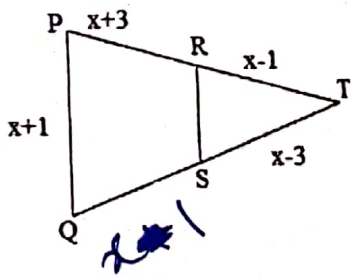
4. The pair of linear equations –x + y = 3 and 3x – 2y = 4 are

i. consistent ii. inconsistent iii. Quadratic iv. not defined

5. $(1 + tan^2\theta)sin^2\theta$ =

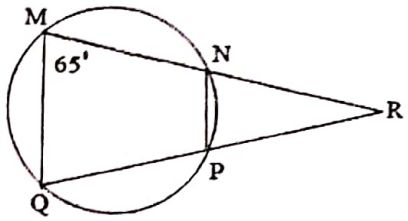
i. $sin^2\theta$ ii. $cos^2\theta$ iii. $tan^2\theta$ iv. $cot^2\theta$

6. Find the value of x for which PQ || RS in figure



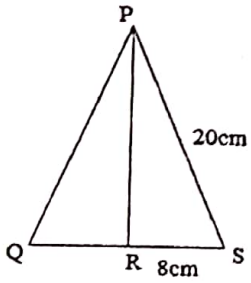
i. 3 ii. 4 iii.5 iv. 6

7. In the figure shown, MN=QP and on producingMN and QP, intersect at R. Also MQ || NP.
If $\angle MNQ = 65^0$, then $\angle R$ =



i. 50^0 ii. 65^0 iii. 130^0 iv. 44^0

8.In the figure, PQ = 20 cm, $\angle QPR = \angle SPR$, then QR =



i. 6 cm ii. 8 cm iii.10 cm iv. 12 cm

9.If the ratio of the areas of two circles is 16 : 25 then the ratio of their circumferences is

i. 4 : 5 ii. 3 : 5 iii. 5 : 6 iv. 4 : 9

10.The ratio between the volume of two spheres is 8 : 27. The ratio of their surface area is

i. 2 : 3 ii. 4 : 5 iii. 5 : 6 iv. 4 : 9

Q.11 – Q.15: Fill in the blanks - **[5 x 1 =5]**

11. The maximum volume of a cone that can be made out of a solid hemisphere of radius r is _____
12. The line touching the circle at a point is called _____
13. $\sin(90^0 - \theta)\cos\theta + \cos(90^0 - \theta)\sin\theta$ = _____
14. Three-digit numbers which are divisible by 3 are _____
15. A die is thrown once. The probability of getting a number more than 3 is _____

OR

Two dies are rolled once. The probability of getting the sum doublets less than 5 is _____

Q.16 – Q.20: Answer the following - **[5 x 1 = 5]**

16. From a point P, the length of the tangent to a circle is 8 cm and the distance of P from the centre of the circle is17 cm.Find the radius of the circle.

OR

Two concentric circles of radii x and y are given, where x>y. Find the chord of the larger circle which touches the smaller circle.

17. Find the distance between the points A(8,-2) and B(13,-6).

18. From the following distribution, find the model class.

Wages in INR	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60
No. of Students	2	11	25	45	57	75

19. For which values of p, does the pair of equations given below has unique solution ?

$4x + py + 8 = 0$

$2x + 2y + 2 = 0$

20. Find the area of a sector of a circle, when the radius of the circle is 21 cm and angle of the sector is 60^0(use $\pi = \frac{22}{7}$)

SECTION B

Q.21 – Q.26: Solve the following:- **[6× 2 = 12]**

21. Using Euclid's division algorithm, find the HCF of 252 and 198.

22. How many terms of the AP: 9, 17, 25, ... must be taken to give a sum of 636 ?

23. If the points A(4,3) and B(x,5) lie on the circle with centre O(2,3), find the value of x.

24. For the given data, find the mode.

Class intervals	1 -3	3 – 5	5 – 7	7 – 9	9 – 11
Frequency	14	16	4	4	2

OR

If the mean of the following data is 12, find x

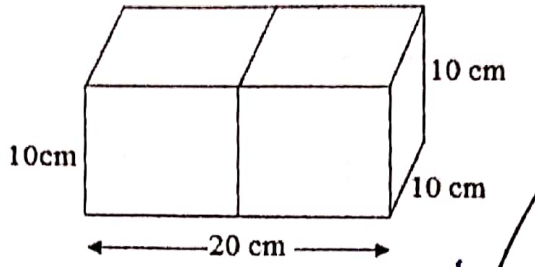
x_i	4	8	12	16	20
f_i	5	3	X	5	4

25. Evaluate $cos^2 30^0 + sin^2 45^0 - \frac{1}{3} tan^2 60^0 + \cos 90^0$

OR

If $\tan\theta = \frac{a}{b}$, find $\frac{a \sin\theta - b\cos\theta}{a \sin\theta + b\cos\theta}$

26. Two cubes each of side 10 cm are joined end to end, forming a rectangle-shaped solid. Find the surface area of the resulting rectangle-shaped solid.



SECTION C

Q.27 – Q.34: Solve the following:- **[8× 3 = 24]**

27. Apply division algorithm to find the quotient and the remainder on dividing the polynomial $3x^3 + 4x^2+6x + 19$ by $x^2+3x + 7$. Also verify the division algorithm.

OR

If α and β are zeroes of the quadratic polynomial $4x^2+4x + 1$, then form a quadratic polynomial whose zeroes are 2α and 2β.

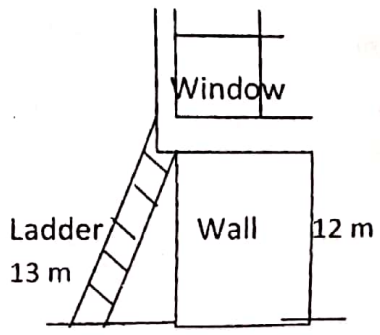
28. Solve for x : $\frac{1}{a} + \frac{1}{b} + \frac{1}{x} = \frac{1}{a+b+x}$: a ≠ 0, b ≠ 0, x ≠ 0.

29. The sum of the 4th and 8th term of an AP is 24 and the sum of the 6th and 10th term is 44. Find the first three terms of the AP.

30. Two poles of heights 6 m and 11 m stands on a plain ground. If the distance between the feet of the poles is 12 m, then find the distance between their tops.

OR

An old man was trying to place a ladder 13 m long in such a way that it reached a window of a building 12 M above the ground. Sandeep decided to help the old man. He placed the foot of the ladder at a distance from the wall such that the top of the ladder reached the window.
Find the distance of the foot of ladder from the wall.



31. Draw a circle of radius 8 cm. From a point 10 cm away from its centre, construct a pair of tangents to the circle and measure their lengths.

32. Find the area of the triangle whose vertices are (1, -1), (-4, 6) and (3, -5).

OR

One end of a line of length 10 units is the point (3, -2). If the ordinate of the other end is 10, what is its abscissa?

33. Prove that $\tan\theta - \cot\theta = \frac{2\sin^2\theta - 1}{\sin\theta\cos\theta}$

34. In a retail market, a retailer was selling pencils kept in packed boxes. These boxes contained varying number of pencils. The following was the distribution of pencils according to the number of boxes :

Number of pencils	50 - 52	53 – 55	56 – 58	59 – 61	62 – 64
Number of boxes	15	110	135	115	25

Find the mean number of pencils kept in a packed box. Which method of finding the mean did you choose?

SECTION D

Q.35 – Q.40: Solve the following:- **[6× 4 = 24]**

35. Show that $3\sqrt{3}$ is an irrational number.

36. Determine graphically the vertices of a triangle. The equations of whose sides are given below:

$2y - x = 8,\ 5y - x = 14,\ -x + \frac{y}{2} = \frac{1}{2}$

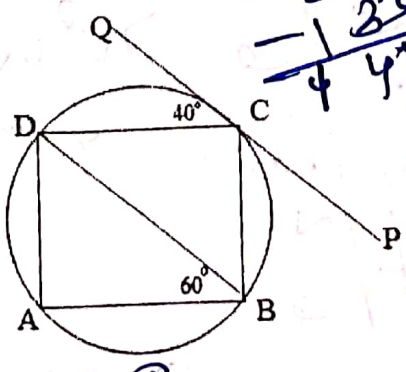
OR

Seven times a two-digit number is equal to four times the number obtained by reversing the order of its digits. If the difference of the digits is 3, determine the number.

37. Two tangents PQ and PR are drawn from an external point to a circle with centre O. Prove that QORP is a cyclicquadrilateral.

OR

In the given figure, ABCD is a cyclic quadrilateral and PQ is tangent to the circle at C. If BD is a diameter, $\angle DCQ = 40^0$ and $\angle ABD = 60^0$, find $\angle BCP$

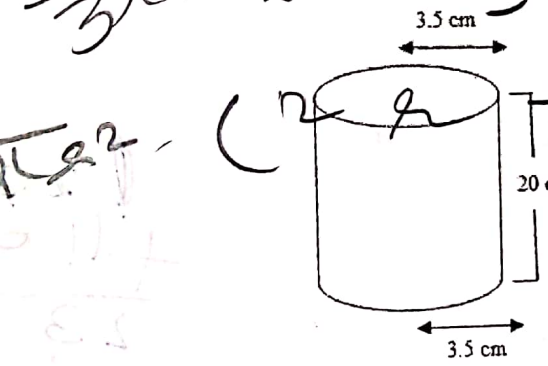


38. A vertical pillar stands on the plain ground and is surmounted by a flagstaff of height 5 m. From a point on the ground, the angle of elevation of the bottom of the flagstaff is 45^0 and that of the top of the flagstaff is 60^0. Find its height from the pillar. (Use $\sqrt{3} = 1.732$)

39. A solid is in the form of a right circular cylinder mounted on a solid hemisphere of radius 14 cm. The radius of the base of the cylindrical part is 14 cm and the vertical height of the complete solid is 28 cm. Find the volume of the solid. (use $\pi = \frac{22}{7}$)

OR

Carpenter made a wooden article by scooping out a hemisphere from each end of a solid cylinder as shown :



If the height of the cylinder is 20 cm and radius of the base is 3.5 cm, find the total surface area of the article.

40. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting
(i) a king of red colour (ii) a face card (iii) the queen of diamonds (iv) a club

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