EDUFEST ACADEMY, PUNE

PRE-BOARD PRACTICE WORKSHEET | MIXED CHAPTERS

CLASS X – MATHEMATICS (STANDARD) – CODE 041

Time Allowed: 3 Hours **Maximum Marks: 80**

Name: _____ Roll No.: _____ Section: _____ Date: _____

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Very Short Answer (VSA) type questions carrying 2 marks each.
4. Section C has 6 Short Answer (SA) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 case based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever not stated.
9. Use of calculators is not allowed.

SECTION – A

This section comprises 20 multiple choice questions (MCQs) of 1 mark each.

1. The LCM of two numbers is 9696 and their HCF is 4. If one of the numbers is 96, the other number is
   (A) 202 (B) 404
   (C) 808 (D) 101

2. The zeroes of the polynomial $x^2 - 3x - m(m + 3)$ are
   (A) m, m + 3 (B) m, −(m + 3)
   (C) −m, −(m + 3) (D) −m, m + 3

3. The quadratic equation $2x^2 - \sqrt{5}\,x + 1 = 0$ has
   (A) two distinct real roots (B) two equal real roots
   (C) no real roots (D) more than two real roots

4. The 10th term from the end of the AP 4, 9, 14, …, 254 is
   (A) 209 (B) 204
   (C) 214 (D) 199

5. If $\Delta ABC \sim \Delta DEF$, $ar(\Delta ABC) : ar(\Delta DEF) = 9 : 16$ and AB = 6 cm, then DE is equal to
   (A) 4.5 cm (B) 9 cm
   (C) 12 cm (D) 8 cm

6. In Fig. 1, DE ∥ BC, AD = 2 cm, DB = 3 cm and DE = 4 cm. Then BC is equal to

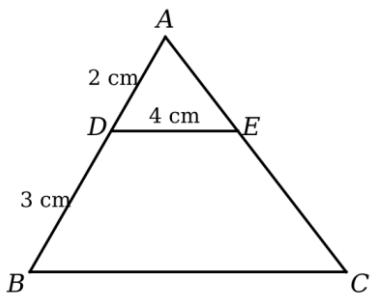


Fig. 1

   (A) 6 cm (B) 8 cm
   (C) 10 cm (D) 12 cm

7. In Fig. 2, PA and PB are tangents drawn from an external point P to a circle with centre O. If ∠APB = 80°, then ∠POA is equal to

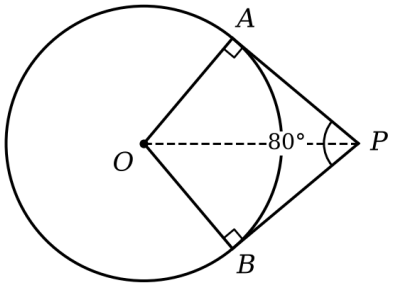


Fig. 2

(A) 40° (B) 50°
(C) 60° (D) 80°

8. The length of the tangent drawn from a point Q, which is 25 cm away from the centre of a circle, is 24 cm. The radius of the circle is
(A) 12 cm (B) 15 cm
(C) 7 cm (D) 24.5 cm

9. The point on the x-axis which is equidistant from the points (2, −5) and (−2, 9) is
(A) (7, 0) (B) (−7, 0)
(C) (0, −7) (D) (0, 7)

10. The ratio in which the x-axis divides the line segment joining the points (3, 6) and (12, −3) is
(A) 2 : 1 (B) 1 : 2
(C) 1 : 1 (D) 3 : 1

11. If $5 \tan \theta = 4$, then $(5 \sin \theta - 3 \cos \theta) / (5 \sin \theta + 2 \cos \theta)$ is equal to
(A) 1/5 (B) 5/6
(C) 6 (D) 1/6

12. $(1 + \tan^2\theta)(1 - \sin \theta)(1 + \sin \theta)$ is equal to
(A) 0 (B) 1
(C) 2 (D) $\sin^2\theta$

13. The perimeter of a sector of a circle of radius 21 cm and central angle 60° is (use $\pi = 22/7$)
(A) 64 cm (B) 22 cm
(C) 43 cm (D) 85 cm

14. A solid sphere of radius r is melted and recast into a solid cone of height r. The radius of the base of the cone is
(A) r (B) 3r
(C) 2r (D) 4r

15. If the mean and the median of a data are 15 and 14 respectively, then its mode is
(A) 13 (B) 14
(C) 16 (D) 12

16. A card is drawn at random from a well-shuffled pack of 52 playing cards. The probability of getting a red face card is
(A) 3/26 (B) 3/13
(C) 1/13 (D) 1/26

17. The probability that a leap year selected at random has 53 Sundays is
(A) 1/7 (B) 2/7
(C) 3/7 (D) 5/7

18. Which of the following cannot be the probability of an event?
(A) 2/3 (B) −1.5
(C) 15% (D) 0.7

Directions (Q. 19 and 20): In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

19. **Assertion (A):** The total surface area of a solid hemisphere of radius r is $2\pi r^2$.
Reason (R): The curved surface area of a hemisphere of radius r is $2\pi r^2$.
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

20. **Assertion (A):** In two concentric circles, a chord of the larger circle which touches the smaller circle is bisected at the point of contact.
Reason (R): A tangent to a circle is parallel to the radius through the point of contact.
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

SECTION – B

This section comprises 5 Very Short Answer (VSA) type questions of 2 marks each.

21. Check whether 6^n can end with the digit 0 for any natural number n. [2]

22. Find the zeroes of the quadratic polynomial $6x^2 - 3 - 7x$ and verify the relationship between the zeroes and the coefficients. [2]

OR

Find a quadratic polynomial, the sum and the product of whose zeroes are −3 and 2 respectively.

23. A die is thrown once. Find the probability of getting (i) a prime number, (ii) a number lying between 2 and 6. [2]

24. In Fig. 3, a quadrilateral ABCD is drawn to circumscribe a circle, with centre O, such that it touches the sides AB, BC, CD and DA at P, Q, R and S respectively. If AB = 6 cm, BC = 7 cm and CD = 4 cm, find AD. [2]

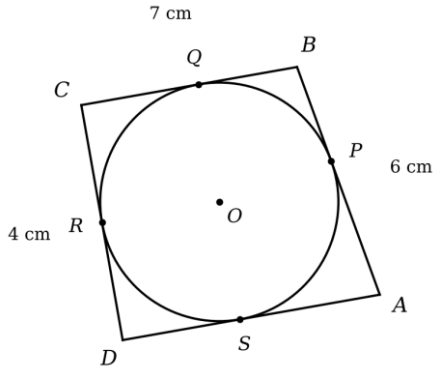


Fig. 3

OR

If the angle between two tangents drawn from an external point P to a circle of radius a and centre O is 60°, then find the length of OP.

25. Two cubes each of volume 64 cm^3 are joined end to end. Find the surface area of the resulting cuboid. [2]

SECTION – C

This section comprises 6 Short Answer (SA) type questions of 3 marks each.

26. Prove that $\sqrt{5}$ is an irrational number. [3]

OR

Prove that $3 + 2\sqrt{5}$ is an irrational number.

27. Solve the following pair of linear equations: $2x + 3y = 11$ and $2x - 4y = -24$. Hence, find the value of 'm' for which $y = mx + 3$. [3]

28. The sum of the first 7 terms of an AP is 63 and the sum of its next 7 terms is 161. Find the 28th term of this AP. [3]

29. Prove that: $(\sin\theta - 2\sin^3\theta) / (2\cos^3\theta - \cos\theta) = \tan\theta$ [3]

OR

If $\sin\theta + \cos\theta = \sqrt{3}$, then prove that $\tan\theta + \cot\theta = 1$.

30. From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45°. Determine the height of the tower. (Refer to Fig. 4; take $\sqrt{3} = 1.73$.) [3]

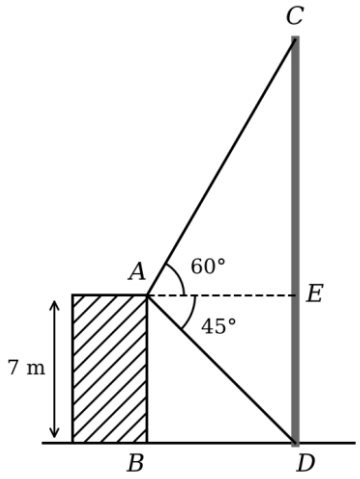


Fig. 4

31. Prove that a parallelogram circumscribing a circle is a rhombus. [3]

SECTION – D

This section comprises 4 Long Answer (LA) type questions of 5 marks each.

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

OR

Solve for x: $1/(x + 4) - 1/(x - 7) = 11/30$, $x \neq -4, 7$.

33. State and prove the Basic Proportionality Theorem (Thales Theorem). [5]

OR

Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

34. A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of the same radius. The total height of the toy is 15.5 cm (Fig. 5). Find the total surface area of the toy. [5]

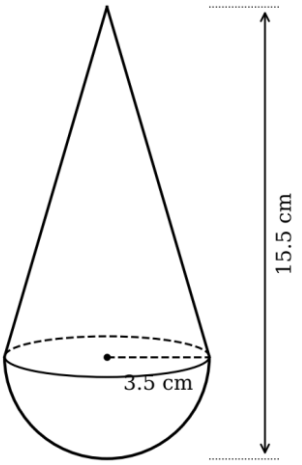


Fig. 5

35. The marks obtained by 50 students in a test are given in the following frequency distribution. Find the median and the mode of the data. [5]

Marks	**0 – 10**	**10 – 20**	**20 – 30**	**30 – 40**	**40 – 50**	**50 – 60**
Number of students	5	8	15	12	6	4

SECTION – E

This section comprises 3 case study based questions of 4 marks each.

Case Study – 1 (Question 36)

A flagpole stands on the top of a building. Aman stands at a point P on level ground, 30 m away from the foot B of the building. From P, the angle of elevation of the top A of the building is 45° and that of the top C of the flagpole is 60°, as shown in Fig. 6. Take $\sqrt{3} = 1.73$.

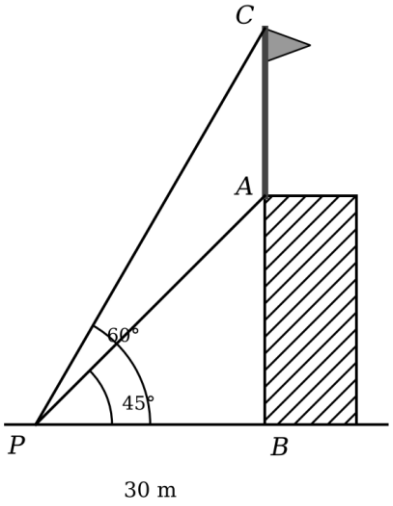


Fig. 6

Based on the above information, answer the following questions:

(i) Find the height AB of the building. [1]

(ii) Find the height BC of the top of the flagpole from the ground. [1]

(iii) Find the height AC of the flagpole. [2]

OR

(iii) Find the distance PC between Aman and the top of the flagpole.

Case Study – 2 (Question 37)

The seating arrangement of an auditorium is such that the first row has 18 seats, the second row has 20 seats, the third row has 22 seats, and so on, with each row having 2 more seats than the row before it. The auditorium has 25 rows in all.

Based on the above information, answer the following questions:

(i) Write the first term and the common difference of the AP formed by the number of seats in the rows. [1]

(ii) How many seats are there in the 15th row? [1]

(iii) Find the total number of seats in the auditorium. [2]

OR

(iii) Which row of the auditorium has exactly 60 seats?

Case Study – 3 (Question 38)

A town planner prepares the layout of a new residential area on a coordinate grid, where 1 unit = 1 km. The School S is located at (2, 3) and the Market M is located at (8, 9), joined by a straight road, as shown in Fig. 7.

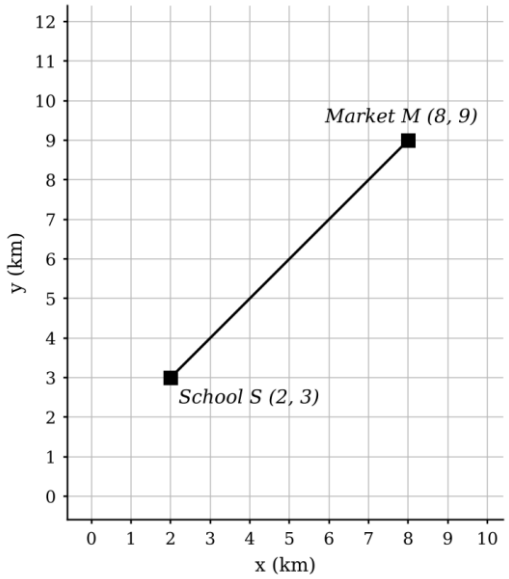


Fig. 7

Based on the above information, answer the following questions:

(i) Find the length of the road SM. [1]

(ii) A bus stop is to be placed at the midpoint of SM. Find its coordinates. [1]

(iii) The park entrance P lies on SM such that SP : PM = 1 : 2. Find the coordinates of P. [2]

OR

(iii) Find the point on the y-axis which is equidistant from the School S and the Market M.

— END OF PAPER —