

PRE-BOARD EXAMINATION (2024-25)

CLASS : X

SUBJECT: MATHEMATICS (STANDARD) (041)

Time Allowed : 3 hours

Maximum Marks : 80

समय : 3 घंटे

अधिकतम अंक : 80

सामान्य निर्देश-

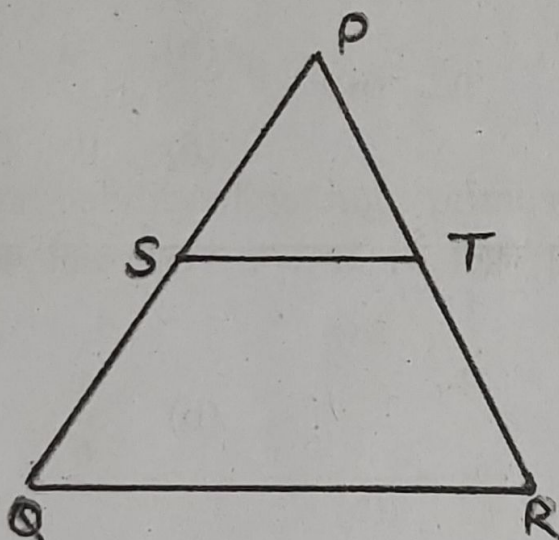
1. इस प्रश्न पत्र में पाँच खंड 'अ', 'ब', 'स', 'द' और 'ई' हैं।
2. खंड 'अ' में 20 बहु-विकल्पीय प्रश्न हैं, जिनमें प्रत्येक 1 अंक का है।
3. खंड 'ब' में 5 प्रश्न हैं, जिनमें प्रत्येक 2 अंक का है।
4. खंड 'स' में 6 प्रश्न हैं, जिनमें प्रत्येक 3 अंक का है।
5. खंड 'द' में 4 प्रश्न हैं, जिनमें प्रत्येक 5 अंक का है।
6. खंड 'ई' में 3 केस आधारित प्रश्न हैं, जिनमें प्रत्येक 4 अंक का है।
7. सभी प्रश्न अनिवार्य हैं। यद्यपि, 5 अंकों वाले 2 प्रश्नों में, 3 अंकों वाले 2 प्रश्नों में तथा 2 अंकों वाले 2 प्रश्नों में आंतरिक विकल्प दिए गए हैं। खंड 'ई' में 2 अंकों वाले प्रश्नों में आंतरिक विकल्प दिए गए हैं।
8. जहाँ भी आवश्यक हो, साफ सुथरी आकृति बनायें। यदि दिया न गया हो, तो आवश्यकता होने पर $\pi = \frac{22}{7}$ प्रयोग कीजिए।
9. कैलकुलेटर का प्रयोग वर्जित है।
10. कृपया प्रश्न का उत्तर लिखने से पहले, प्रश्न का क्रमांक अवश्य लिखें।

GENERAL INSTRUCTIONS:

1. This question paper has 5 sections 'A', 'B', 'C', 'D' and 'E'.
2. Section A has 20 MCQs 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 carrying 4 marks each.
7. All questions are compulsory. However, an internal choice in 2 questions of 5 marks, 2 questions 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 $\pi = \frac{22}{7}$ wherever required, if not stated.
9. Use of calculator is not permitted.
10. Please do write down the serial number of questions before attempting it.

- 1 6. The roots of the quadratic equation $x^2 - 0.04 = 0$ are : = 40 1
- (a) ± 0.02 (b) 2
- (c) 0.4 (d) ± 0.2
- 1 7. The class mark of class interval 19.5 – 24.5 is : 1
- (a) 5 (b) 2.5
- (c) 44 (d) 22
- वृत्त का 8. If AT is tangent to the circle with centre O and $OT = 4$ cm and $\angle OTA = 30^\circ$ then the radius of the circle is : 1
- (a) 8 cm (b) 2 cm
- (c) 4 cm (d) $2\sqrt{3}$ cm
9. If $P(A)$ denotes the probability of an event A then : 1
- (a) $P(A) < 0$ (b) $P(A) > 1$
- (c) $0 \leq P(A) \leq 1$ (d) $0 < P(A) < 1$
10. The pair of linear equations $2x = 5y + 6$ and $15y = 6x - 18$ represents two lines which are : 1
- (a) Intersecting (b) Parallel
- (c) Coincident (d) Either Intersecting or Parallel
11. If $\frac{1}{2}$ is a root of equation $x^2 - Kx - \frac{5}{4} = 0$ then the value of K is : 1
- (a) 2 (b) -2
- (c) $-\frac{1}{2}$ (d) $\frac{1}{2}$

12. In the given figure, $ST \parallel QR$ and the point S divides PQ in the ratio 4:5. If $ST = 1.6$ cm then the value of QR is : 1



- (a) 0.7 cm (b) 2.5 cm
(c) 2 cm (d) 3.6 cm
13. The difference between circumference and the radius of a circle is 37 cm. The area of the circle is : 1
- (a) 154 cm^2 (b) 184 cm^2
(c) 134 cm^2 (d) 259 cm^2
14. If the perimeter of semicircular protractor is 36 cm then the diameter of protractor is : 1
- (a) 12 cm (b) 14 cm
(c) 16 cm (d) 18 cm
15. In triangles ABC and DEF, $\frac{AB}{DE} = \frac{BC}{FD}$ then the triangles will be similar if : 1
- (a) $\angle B = \angle E$ (b) $\angle A = \angle D$
(c) $\angle B = \angle D$ (d) $\angle A = \angle F$

का 16. If P(-1, 1) is the midpoint of line segment joining points A(-3, b) and B(1, b+4) then the value of b is : 1

(a) 1

(b) -1

(c) 2

(d) 0

1 17. A die is thrown once. The probability of getting a prime number is : 1

(a) 0

(b) $\frac{1}{6}$

(c) $\frac{1}{2}$

(d) 1

ग 18. A chord of a circle is equal to the radius of the circle then the angle subtended by chord at minor arc is : 1

(a) 150°

(b) 30°

(c) 60°

(d) 120°

Directions for Q 19 & 20 :

There is one Assertion (A) and one Reason (R). Choose the correct answer of these questions from the four options (a), (b), (c) and (d) given below :

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

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

फि (c) Assertion (A) is true but Reason (R) is false.

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

19. **Assertion (A)** : The discriminant 'D' of the quadratic equation $2x^2 - 4x + 3 = 0$, is (-8) and hence its roots are not real. 1

Reason (R) : If $b^2 - 4ac < 0$, then roots are not real.

20. **Assertion (A)** : All congruent triangles are similar but the similar triangles need not to be congruent. 1

Reason (R) : If the corresponding sides of two triangles are proportional, then they are similar.

SECTION-B

Q 21-25 are very short answer type questions. Each question is of 2 marks.

21. If the sum of LCM and HCF of two numbers is 126 and their LCM is 90 more than their HCF, then find the product of two numbers. 2

OR

Show that for any natural number n , 6^n does not end with digit 0.

22. If $\tan \theta = \frac{4}{5}$ then find $\frac{2 \sin \theta \cos \theta}{\cos^2 \theta - \sin^2 \theta}$. 2

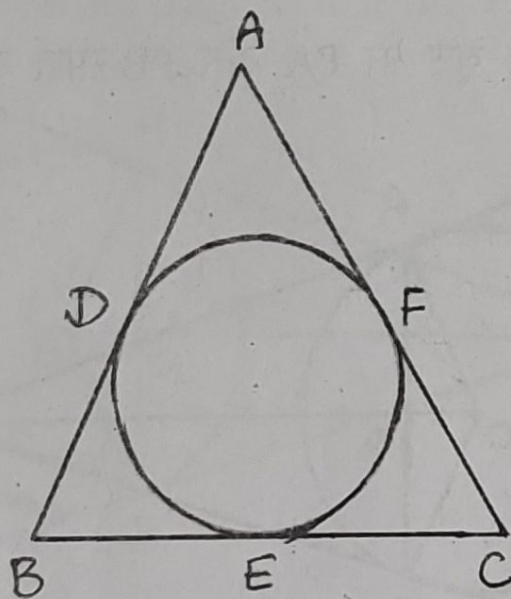
23. In what ratio does the point $C\left(\frac{3}{5}, \frac{11}{5}\right)$ divide the line segment joining the points $A(3, 5)$ and $B(-3, -2)$. 2

OR

Find a point on y-axis which is equidistant from point $A(6, 5)$ and point $B(-4, 3)$.

2 24. In the given figure, if $AB = BC$ then prove that $AF = FC$.

2



कता 25. A card is drawn from a well shuffled deck of playing cards. Find the probability that the card drawn is :

2

- (i) neither an ace nor a king
- (ii) either a red card or a queen

SECTION-C

Q 26-31 are short answer type questions. Each question is of 3 marks.

3 26. Find the zeroes of the polynomial $5\sqrt{5}x^2 + 30x + 8\sqrt{5}$.

3

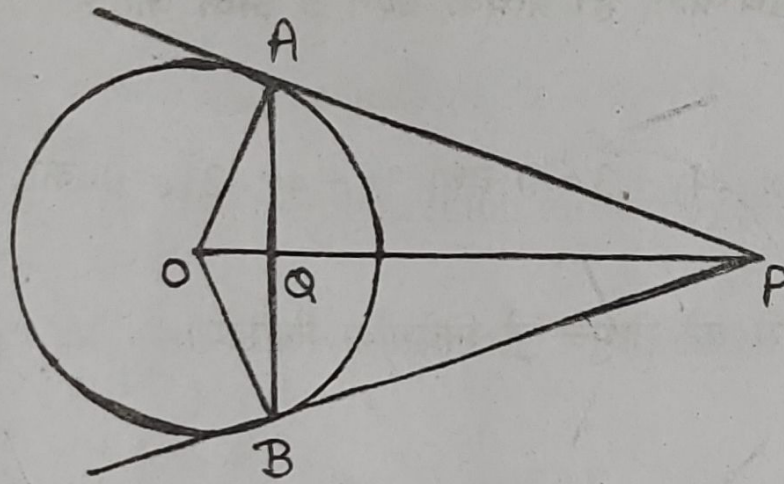
सिद्ध 27. A circle touches the sides of a quadrilateral ABCD at P, Q, R and S respectively. Show that :

3

$$\angle AOB + \angle COD = 180^\circ$$

OR

In the given figure, PA and PB are tangents to a circle centred at O. Prove that



- (i) OP bisects $\angle APB$ bisector of AB
- (ii) OP is the right angle
28. The sum of two numbers is 15. If the sum of their reciprocals is $\frac{5}{18}$ then find the numbers. 3
29. Prove that $2 - \sqrt{3}$ is an irrational number. 3
30. Two circles of different sizes are joined together such that the distance between their centres is 14 cm. If the sum of their areas is $130 \pi \text{cm}^2$ then find the radius of each circle. 3

OR

The perimeter of a sector of a circle of radius 6 cm is 18.28 cm. Find the area of the sector. (Use $\pi = 3.14$)

31. If A $(-2, -2)$ and B $(2, -4)$ are two points then find the co-ordinates of P such that $AP = \frac{3}{7} AB$. 3

(Perimeter of Circle)
Formula

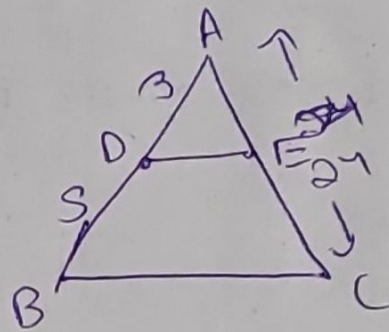
SECTION-D

Q 32-35 are long answer type questions. Each question is of 5 marks.

32. Solve graphically the pair of linear equations $3x - 4y + 3 = 0$ and $3x + 4y - 21 = 0$. Find the co-ordinates of vertices of triangular region formed by these lines and x-axis. 5

33. State and prove basic proportionality theorem. In $\triangle ABC$, $DE \parallel BC$, 5

$\frac{AD}{DB} = \frac{3}{5}$ and $AC = 24$ cm then find the value of AE . 5



34. Prove that 5

$$(\sin \theta + \sec \theta)^2 + (\cos \theta + \operatorname{cosec} \theta)^2 = (1 + \sec \theta \operatorname{cosec} \theta)^2$$

OR

Prove that

$$\frac{\tan A}{1 - \cot A} + \frac{\cot A}{1 - \tan A} = 1 + \tan A + \cot A$$

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Find the median and mode of data if mean is 75.8.

Marks	No. of Students
Less than 10	0
Less than 30	10
Less than 50	25
Less than 70	43
Less than 90	65
Less than 110	87
Less than 130	96
Less than 150	100

OR

The mean of the following frequency table is 50. Find the missing frequencies.

Class Interval	0-20	20-40	40-60	60-80	80-100	Total
Frequency	17	p	32	q	19	120

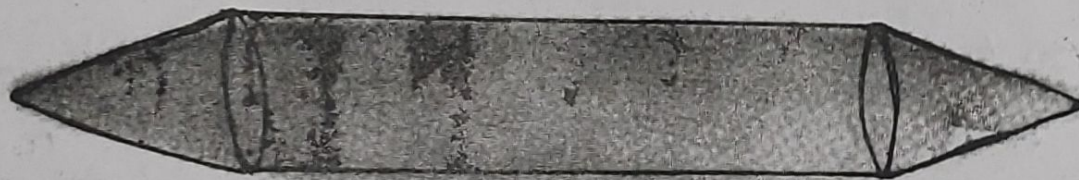
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120

SECTION-E

Q 36-38 are case based questions. Each question is of 4 marks.

36. A student is making a model in the shape of Gilli, where he attached one cylinder and two cones. The diameter of the model is 6 cm and total length of the model is 18 cm. Each cone has a height of 4 cm.



Based on the above information, answer the following questions.

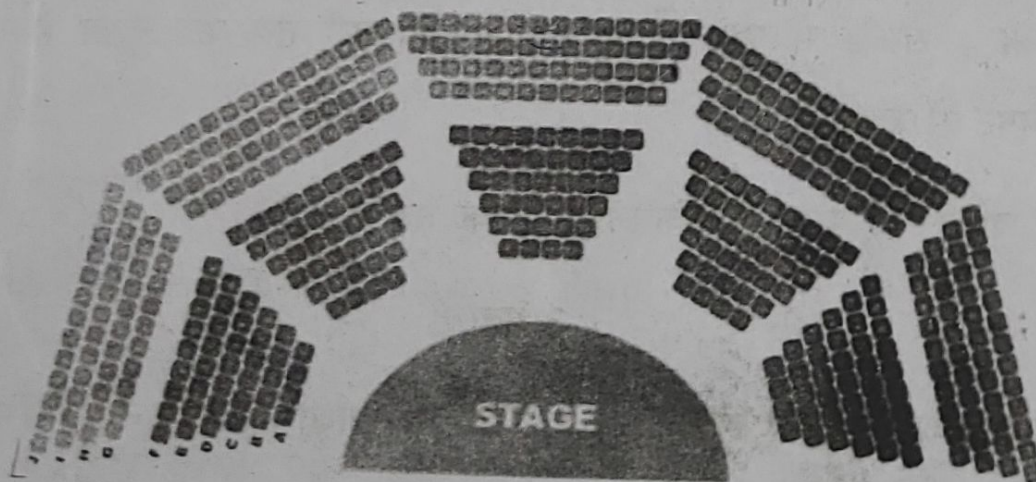
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|-------|---|---|
| (i) | Find the height of cylinder used in gilli. | 1 |
| (ii) | Find the slant height of cone. | 1 |
| (iii) | Find the volume of wood used in making the model. | 2 |

OR

How much paper is required to cover the model with paper?

(neglecting the wastage in cutting)

37. On teacher's day, Shaina alongwith five other students performed in a stadium. The total number of chairs in the stadium is 1260. The chairs are arranged in such a way that each row has 12 chairs more than the previous row.



$\frac{1260}{12} = 105$

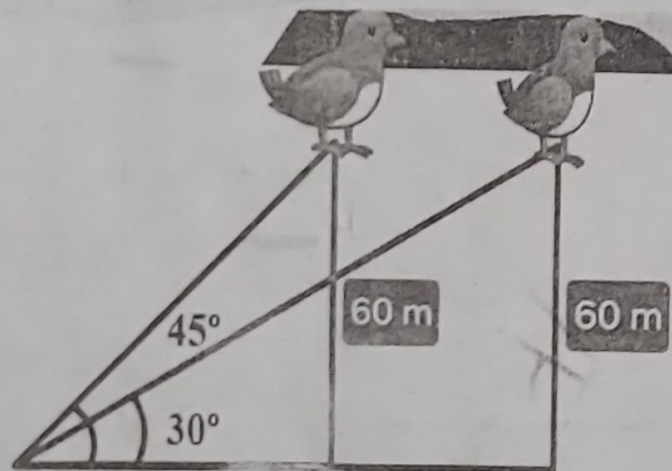
Based on the above information, answer the following questions.

- (i) If there are 12 chairs in first row then find the number of chairs in the third row. 1
- (ii) Find the difference between the number of chairs in fifth and eighth row. 1
- (iii) How many rows are there in the stadium? 2

OR

If there are a total of 15 rows in the stadium then find the number of chairs in the middle row?

38. Raju is sitting in the park and watching birds. A bird is sitting on the top of a 60 m high tree. The angle of elevation of the bird from Raju is 45° . The bird flies away from the point of observation horizontally and remains at a constant height. After 4 seconds, the angle of elevation of the bird from the point of observation becomes 30° .



Based on the above information, answer the following questions.

- (i) At what distance from under the tree was Raju sitting and watching the birds? 1
- (ii) If the bird has flown a distance of $20(\sqrt{3} + 1)$ m in 4 seconds then find its speed in metre/minute. 1
- (iii) How far did the bird fly in the given time? 2

OR

After 4 seconds, the bird was at what distance from Raju? Find the difference of this distance and initial distance of the bird from Raju.