



DINESH TUITION CENTER,
(Opposite Aanandh Jewellery)
19, Paalayam Bazzar, Woraiyur, Trichy

11th Standard Mathematics

**Quarterly Model Question Paper
2022-2023**

Quarterly Common Exam - Model Question Paper - 2022-23.

11th Standard.

Part - I

20x1 = 20

Answer all questions

- For non-empty sets A and B, if $A \subset B$ then $(A \times B) \cap (B \times A)$ is equal to
(1) $A \cap B$ (2) $A \times A$ (3) $B \times B$ (4) none of these.
- If $A = \{(x, y) : y = e^x, x \in \mathbb{R}\}$ and $B = \{(x, y) : y = e^{-x}, x \in \mathbb{R}\}$ then $n(A \cap B)$ is
(1) Infinity (2) 0 (3) 1 (4) 2
- The rule $f(x) = x^2$ is a bijection if the domain and the co-domain are given by
(1) $\mathbb{R}, \mathbb{R}$ (2) $\mathbb{R}, (0, \infty)$ (3) $(0, \infty), \mathbb{R}$ (4) $[0, \infty), [0, \infty)$
- If the function $f: [-3, 3] \rightarrow S$ defined by $f(x) = x^2$ is onto, then S is
(1) $[-9, 9]$ (2) $\mathbb{R}$ (3) $[-3, 3]$ (4) $[0, 9]$
- If $|x+2| \leq 9$, then x belongs to
(1) $(-\infty, -7)$ (2) $[-11, 7]$ (3) $(-\infty, -7) \cup [11, \infty)$ (4) $(-11, 7)$
- The solution of $5x-1 < 24$ and $5x+1 > -24$ is
(1) $(4, 5)$ (2) $(-5, -4)$ (3) $(-5, 5)$ (4) $(-5, 4)$
- The number of solutions of $x^2 + |x-1| = 1$ is
(1) 1 (2) 0 (3) 2 (4) 3

8. The maximum Value of $4\sin^2 x + 3\cos^2 x + \sin \frac{x}{2} + \cos \frac{x}{2}$ is
 (1) $4 + \sqrt{2}$ (2) $3 + \sqrt{2}$ (3) 9 (4) 4
9. $\cos 1^\circ + \cos 2^\circ + \cos 3^\circ + \dots + \cos 179^\circ =$
 (1) 0 (2) 1 (3) -1 (4) 89
10. If $\sin \alpha + \cos \alpha = b$, then $\sin 2\alpha$ is equal to
 (1) $b^2 - 1$, if $b \leq \sqrt{2}$ (2) $b^2 - 1$, if $b > \sqrt{2}$ (3) $b^2 - 1$, if $b \geq 1$ (4) $b^2 - 1$, if $b \geq \sqrt{2}$
11. The Product of r consecutive positive integers is divisible by
 (1) $r!$ (2) $(r-1)!$ (3) $(r+1)!$ (4) r^r
12. If $a^2 \cdot {}^a C_2 = a^3 \cdot {}^a C_4$ then the Value of 'a' is
 (1) 2 (2) 3 (3) 4 (4) 5
13. If ${}^n C_4, {}^n C_5, {}^n C_6$ are in AP the Value of n can be
 (1) 14 (2) 11 (3) 9 (4) 5
14. The Value of $2 + 4 + 6 + \dots + 2n$ is
 (1) $\frac{n(n-1)}{2}$ (2) $\frac{n(n+1)}{2}$ (3) $\frac{2n(2n+1)}{2}$ (4) $n(n+1)$
15. If $a, 8, b$ are in AP, $a, 4, b$ are in GP, and if a, x, b are in HP then x is
 (1) 2 (2) 1 (3) 4 (4) 16
16. The remainder when 38^{15} is divided by 13 is
 (1) 12 (2) 1 (3) 11 (4) 5

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17. Which of the following equation is the locus of $(at^2, 2at)$
- (1). $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ (2). $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (3). $x^2 + y^2 = a^2$ (4). $3x^2 - y^2 = 0$.
18. The Slope of the line which makes an angle 45° with the line $3x - y = -5$ are
- (1). 1, -1 (2). $\frac{1}{2}, -2$ (3). $1, \frac{1}{2}$ (4). $2, -\frac{1}{2}$
19. The Point on the line $2x - 3y = 5$ is equidistance from $(1, 2)$ and $(3, 4)$ is
- (1). $(7, 3)$ (2). $(4, 1)$ (3). $(1, -1)$ (4). $(-2, 3)$
20. If One of the lines given by $6x^2 - xy + 4cy^2 = 0$ is $3x + 4y = 0$, then c equals to
- (1). -3 (2). -1 (3). 3 (4). 1.

Part - II.

Answer any SEVEN questions.

7 × 2 = 14

Q.No 30. is Compulsory.

21. If $n(P(A)) = 1024$, $n(A \cup B) = 15$ and $n(P(B)) = 32$, then find $n(A \cap B)$
22. Solve $\left| \frac{2}{x-4} \right| > 1, x \neq 4$.
23. Write $f(x) = x^2 + 5x + 4$ in completed Square form
24. Find the length of an arc of a circle of radius 5cm subtending a central angle measuring 15° .
25. If $a \cos \theta - b \sin \theta = c$, Show that $a \sin \theta + b \cos \theta = \pm \sqrt{a^2 + b^2 - c^2}$

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26. Simplify $\frac{7!}{2!}$

27. Compute 102^4 .

28. Show the points $(0, -\frac{3}{2})$, $(1, -1)$ and $(2, -\frac{1}{2})$ are collinear.

29. Consider a hollow cylindrical vessel, with circumference 24 cm and height 10 cm. An ant is located on the outside of vessel 4 cm from the bottom. There is a drop of honey at the diametrically opposite inside of the vessel, 3 cm from the top.

30. Prove : The Product of an odd function and an even function is an odd function.

Part - III

Answer any SEVEN questions.

7x3=21

Q.No. 40 is compulsory.

31. Check the relation $R = \{(1,1), (2,2), (3,3), \dots, (n,n)\}$ defined on the set $S = \{1, 2, 3, \dots, n\}$ for the three basic relations.

32. Solve $\sqrt{x+14} < x+2$

33. Find the zeros of the polynomial function $f(x) = 4x^2 - 25$

34. Prove that
$$\frac{\sin \theta + \sin 2\theta}{1 + \cos \theta + \cos 2\theta} = \tan \theta$$

35. Find the distinct permutations of the letters of word MISSISSIPPI

36. Prove that ${}^{10}C_2 + 2 \times {}^{10}C_3 + {}^{10}C_4 = {}^{12}C_4$

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37. Find $\sum_{k=1}^n \frac{1}{k(k+1)}$
38. Expand the following in ascending Powers of x and find the condition on x for which the binomial expansion is valid.
 $(x+2)^{\frac{2}{3}}$
39. Find the equations of a Parallel line and a perpendicular line Passing through the point $(1,2)$ to the line $3x+4y=7$
40. Prove : $\sin 3A = 3 \sin A - 4 \sin^3 A$.

Part - IV

7x5=35

41.a) Find the range of the function $f(x) = \frac{1}{1-3\cos x}$

OR

b) Graph the functions $f(x) = x^3$ and $g(x) = \sqrt[3]{x}$ on the same coordinate plane. Find $f \circ g$ and graph it on the plane as well. Explain your results.

42. a) Solve $\frac{x+1}{x+3} < 3$

OR

b) Determine the region in the plane determined by the inequalities
 $2x+y \geq 8, x+2y \geq 8, x+y \leq 6$.

43. If $A+B+C=\pi$, Prove that $\cos^2 A + \cos^2 B + \cos^2 C = 1 - 2\cos A \cos B \cos C$

a) ~~convert to cosines~~

OR

b) State and Prove Projection formula.

- 44 a. By the Principle of mathematical induction, Prove that, for $n \geq 1$

$$1^2 + 3^2 + 5^2 + \dots + (2n-1)^2 = \frac{n(2n-1)(2n+1)}{3}$$

OR

- b. Find the number of strings of 5 letters that can be formed with the letters of the word PROPOSITION.

45.

- a. Prove that $\sqrt[3]{x^3+7} - \sqrt[3]{x^3+4}$ is approximately equal to $\frac{1}{x^2}$ when x is large.

OR.

- b. If a, b, c are respectively the $p^{\text{th}}, q^{\text{th}}$ and r^{th} terms of a GP, Show that $(q-r)\log a + (r-p)\log b + (p-q)\log c = 0$

46. a. Separate the equations $5x^2 + 6xy + y^2 = 0$

OR

- b. Prove that the straight lines joining the origin to the points of intersection of $3x^2 + 5xy - 3y^2 + 2x + 3y = 0$ and $3x - 2y - 1 = 0$ are at right angles.

47. a. Show that $\cot(A+15^\circ) - \tan(A-15^\circ) = \frac{4 \cos 2A}{1 + 2 \sin 2A}$.

OR.

- b. The slope of one of the straight lines $ax^2 + 2hxy + by^2 = 0$ is twice that of the other, show that $8h^2 = 9ab$.

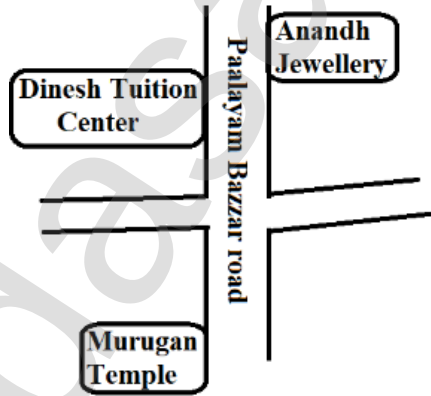


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- CBSE, State board - 10, 11, 12 ஆம் வகுப்புகளுக்கு கணக்கு பாடம் சிறந்த முறையில் கற்பிக்கப்படும்.
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