

SAFAL EDUCATION ACADEMY

STANDARD – X

MATHS

[Banking, GST, Share and Dividend, Inequations, Matrix, Ratio-Proportion]

[Quadratic Eq, Trigonometry, Height-Distance, Reflection] [AT-13]

TIME : 1.0 Hr

MARKS : 60

NAME : _____

Marks Obtained : _____

Q – 1 Choose the correct answers to the questions from the given options [6]

- The roots of the quadratic equation $x^2 - 8x - 20 = 0$ are
(a) 5, -4 (b) -4, 5 (c) 10, -2 (d) -10, 2
- If the polynomials $ax^3 + 3x^2 + 5x - 4$ and $x^3 - 4x + a$ leave same remainder, when divided by $(x - 2)$, then the value of a is
(a) $11/7$ (b) $18/7$ (c) $-18/7$ (d) $-11/7$
- Which term of an AP 19, 17, 15.... is -83?
(a) 54th (b) 52th (c) 54th (d) 56th
- The solution set of the inequation $5x - 8 < 2x + 4$ is
(a) $(-\infty, 4)$ (b) $(-\infty, 4]$ (c) $(4, \infty)$ (d) $[4, \infty)$ Ans (b)
- If the cost of an article is Rs 20000 and GST paid by the owner is Rs 4400, then rate of CGST is
(a) 12% (b) 13% (c) 11% (d) 22%
- The value of x , if $5 : x :: 5 : 18$ is
(a) 18 (b) 20 (c) 17 (d) 21

Q – 2 Solve the following [Banking] [3]

- Mr. Akash deposits a certain sum of money each month in a recurring deposit account of a bank. If the rate of interest is 8% per annum and Akash gets Rs 9099 from the bank after 3 yr, find the value of his monthly instalment.

Q – 3 Answer the following [GST] [4]

- The printed price of an item is 45000. The manufacturer allows a discount of 18% to a dealer Deepak. The dealer Deepak sells the item to another dealer Nitin at a discount of 8% on the printed price. Suppose all the sales are intra state and the rate of GST is 12%. Find (a) the price of an item inclusive tax (under GST) paid by the dealer Deepak. (b) the price of an item inclusive tax (under GST) paid by the dealer Nitin.

Q – 4 Solve the following [Shares and Dividend] [6]

- Ashok invested Rs 26400 on 12%, Rs 25 shares of a company. If he receives a dividend of Rs 2475, find the: (i) Number of shares he bought (ii) Market value of each share.
- Sunil bought 50 shares of Rs 10 at Rs 18. Find his investment if the dividend declared by the company is 16%. Find: (i) his income and (ii) the rate of interest he gets on his investment.

Q – 5 Solve the following [Inequations] [3]

- Find the value of x , which satisfies the inequation. Graph the solution on the number line.

$$-2 \leq \frac{1}{2} - \frac{2x}{3} \leq 1 - \frac{5}{6}, x \in \mathbb{N}.$$

Q – 6 Solve the following [Ratio-Proportion] [6]

1. Find x, from the equation

$$\frac{\sqrt{a+x} + \sqrt{a-x}}{\sqrt{a+x} - \sqrt{a-x}} = b.$$

2. If a, b, c and d are in continued proportion, then prove that

$$\frac{(a-b)^3}{(b-c)^3} = \frac{a}{d}.$$

Q – 7 Solve the following [Matrix] [4]

1. Find the matrix A (3B -2C) for following

$$A = \begin{bmatrix} 5 & 2 \\ -3 & 1 \end{bmatrix}, B = \begin{bmatrix} 1 & 0 \\ 2 & -1 \end{bmatrix} \text{ and } C = \begin{bmatrix} -4 & 1 \\ 6 & 1 \end{bmatrix}$$

Q – 8 Solve the following [Quadratic Eq.] [3]

1. Solve for x

$$\frac{x-1}{x+2} + \frac{x-3}{x-4} = \frac{10}{3}, x \neq -2, 4$$

Q – 9 Prove that [Trigonometry] [9]

$$(a) \frac{\sin \theta}{1 - \cos \theta} = \operatorname{cosec} \theta + \cot \theta.$$

$$(b) (\operatorname{cosec} A - \sin A)(\sec A - \cos A)\sec^2 A = \tan A.$$

$$(c) \sec A (1 - \sin A)(\sec A + \tan A) = 1.$$

Q – 10 Solve the following [Factorization] [4]

1. Using the remainder theorem, factorise completely the following polynomial.

$$3x^3 + 2x^2 - 19x + 6$$

Q – 11 Solve the following [Reflection] [5]

1. Use graph paper to answer the following question (take 1 cm=1 unit on both axes).

(a) Plot A (4, 4), B (4, -6) and C (8,0) the vertices of a AABC.

(b) Reflect ABC on Y axis and name it as A'B'C'. Write coordinates of the images A', B' and C'.

(c) Give the geometrical name for the figure AA' C'B' BC.

(d) Identify the line of symmetry of AA' C'B' BC.

Q – 12 Solve the following [AP] [4]

1. The sum of the four consecutive numbers in an AP is 32 and the ratio of the product of the first and last terms to the product of two middle terms is 7: 15. Find the numbers.

Q – 13 Solve the following [Height - Distance] [3]

1. From the top of a hill, the angle of depression of two consecutive kilometre stone due West are 30° and 45°, respectively. Find the height of the hill.

ANSWERS**Q – 1 Choose the correct answers to the questions from the given options [6]**

- The roots of the quadratic equation $x^2 - 8x - 20 = 0$ are
(a) 5, - 4 (b) - 4, 5 (c) 10, - 2 (d) -10, 2
- If the polynomials $ax^3 + 3x^2 + 5x - 4$ and $x^3 - 4x + a$ leave same remainder, when divided by $(x - 2)$, then the value of a is
(a) 11/7 (b) 18/7 (c) -18/7 (d) -11/7
- Which term of an AP 19, 17, 15.... is -83?
(a) 54th (b) 52th (c) 54th (d) 56th
- The solution set of the inequation $5x - 8 \leq 2x + 4$ is
(a) $(-\infty, 4)$ (b) $(-\infty, 4]$ (c) $(4, \infty)$ (d) $[4, \infty)$ **Ans (b)**
- If the cost of an article is Rs 20000 and GST paid by the owner is Rs 4400, then rate of CGST is
(a) 12% (b) 13% (c) 11% (d) 22%
- The value of x, if $5 : x :: 5 : 18$ is
(a) 18 (b) 20 (c) 17 (d) 21

Q – 2 Solve the following [Banking] [3]

- Mr. Akash deposits a certain sum of money each month in a recurring deposit account of a bank. If the rate of interest is 8% per annum and Akash gets Rs 9099 from the bank after 3 yr, find the value of his monthly instalment. (Ans Rs 225)

Q – 3 Answer the following [GST] [4]

- The printed price of an item is 45000. The manufacturer allows a discount of 18% to a dealer Deepak. The dealer Deepak sells the item to another dealer Nitin at a discount of 8% on the printed price. Suppose all the sales are intra state and the rate of GST is 12%. Find (a) the price of an item inclusive tax (under GST) paid by the dealer Deepak. (b) the price of an item inclusive tax (under GST) paid by the dealer Nitin. [Ans (a) Rs 41328 (b) Rs 46368]

Q – 4 Solve the following [Shares and Dividend] [6]

- Ashok invested Rs 26400 on 12%, Rs 25 shares of a company. If he receives a dividend of Rs 2475, find the: (i) Number of shares he bought (ii) Market value of each share. [Ans (i) 825, (ii) Rs 32]

2. Sunil bought 50 shares of Rs 10 at Rs 18. Find his investment if the dividend declared by the company is 16%. Find: (i) his income and (ii) the rate of interest he gets on his investment. [Ans (i) Rs 80, (ii) $8\frac{8}{9}\%$]

Q – 5 Solve the following [Inequations] [3]

1. Find the value of x, which satisfies the inequation. Graph the solution on the number line.

$$-2 \leq \frac{1}{2} - \frac{2x}{3} \leq 1\frac{5}{6}, x \in N.$$

$$\text{Ans } -2 \leq x \leq 3\frac{3}{4}, x \in N \quad \{1, 2, 3\}$$

Q – 6 Solve the following [Ratio-Proportion] [6]

1. Find x, from the equation

$$\frac{\sqrt{a+x} + \sqrt{a-x}}{\sqrt{a+x} - \sqrt{a-x}} = b. \quad \text{Ans } \frac{2ab}{b^2 + 1}$$

2. If a, b, c and d are in continued proportion, then prove that

$$\frac{(a-b)^3}{(b-c)^3} = \frac{a}{d}$$

Q – 7 Solve the following [Matrix] [4]

1. Find the matrix A ($3B - 2C$) for following

$$A = \begin{bmatrix} 5 & 2 \\ -3 & 1 \end{bmatrix}, B = \begin{bmatrix} 1 & 0 \\ 2 & -1 \end{bmatrix} \text{ and } C = \begin{bmatrix} -4 & 1 \\ 6 & 1 \end{bmatrix} \quad \text{Ans } \begin{bmatrix} 43 & -20 \\ -39 & 1 \end{bmatrix}$$

Q – 8 Solve the following [Quadratic Eq.] [3]

1. Solve for x

$$\frac{x-1}{x+2} + \frac{x-3}{x-4} = \frac{10}{3}, x \neq -2, 4 \quad (\text{Ans } 4.56 \text{ and } -4.05)$$

Q – 9 Prove that [Trigonometry] [9]

$$(a) \frac{\sin \theta}{1 - \cos \theta} = \operatorname{cosec} \theta + \cot \theta.$$

$$(b) (\operatorname{cosec} A - \sin A)(\sec A - \cos A)\sec^2 A = \tan A.$$

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Q – 10 Solve the following [Factorization] [4]

1. Using the remainder theorem, factorise completely the following polynomial.

$$3x^3 + 2x^2 - 19x + 6 \quad [\text{Ans } f(x) = (x - 2)(x + 3)(3x - 1)]$$

Q – 11 Solve the following [Reflection] [5]

1. Use graph paper to answer the following question (take 1 cm=1 unit on both axes).

- (e) Plot A (4, 4), B (4, -6) and C (8,0) the vertices of a AABC.
- (f) Reflect ABC on Y axis and name it as A'B'C'. Write coordinates of the images A', B' and C'.
- (g) Give the geometrical name for the figure AA' C'B' BC.
- (h) Identify the line of symmetry of AA'C'B' BC.

[Ans (a) 4, (c) Hexagon, (d) Line of symmetry of figure is the Y-axis]

Q – 12 Solve the following [AP] [4]

1. The sum of the four consecutive numbers in an AP is 32 and the ratio of the product of the first and last terms to the product of two middle terms is 7: 15. Find the numbers. [Ans 2, 6, 10, 14 and 14, 10, 6, 2]

Q – 13 Solve the following [Height - Distance] [3]

1. From the top of a hill, the angle of depression of two consecutive kilometre stone due West are 30° and 45° , respectively. Find the height of the hill. [Ans 1.370 Km]

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