Gujranwala Board 2024

Objective Type

Roll No. Candidate: _____

Business Mathematics (Intermediate Part-I, Class 11th (1st A-324-IV) Paper I
(Commerce Group)

Time : 15 Minutes Code = 6647 Marks: 10

NOTE: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q1.

1. **If a : b = c : d then:**
   (A) ab = cd (B) ac = bd (C) ad = bc (D) abc = d
2. **If three times of a number is 150, then number is:**
   (A) 50 (B) 100 (C) 35 (D) 65
3. **Conversion of $(10)_2$ in decimal system is:**
   (A) 2 (B) 3 (C) 4 (D) 5
4. **18 to 30 is same as:**
   (A) 3 : 4 (B) 3 : 5 (C) 6 : 7 (D) 2 : 3
5. **If A = [2 3 4] ; then A^t = ?**
   (A) $\begin{bmatrix}3\\2\\4\end{bmatrix}$ (B) $\begin{bmatrix}4\\3\\2\end{bmatrix}$ (C) [4 3 2] (D) $\begin{bmatrix}2\\3\\4\end{bmatrix}$
6. **The value of f(x) = 4x + 100 at x = 2 is:**
   (A) 104 (B) 106 (C) 108 (D) 110
7. **If X = $\begin{bmatrix}3\\4\end{bmatrix}+\begin{bmatrix}-8\\5\end{bmatrix}$, then X = ?**
   (A) $\begin{bmatrix}-5\\9\end{bmatrix}$ (B) $\begin{bmatrix}9\\5\end{bmatrix}$ (C) $\begin{bmatrix}-5\\-9\end{bmatrix}$ (D) $\begin{bmatrix}5\\9\end{bmatrix}$
8. **The soulution of $x^2 - x = 0$:**
   (A) 0 , 4 (B) 1 , −1 (C) 0 , 1 (D) 1 , −1
9. **If an amount is doubled in 1 year, then rate of simple interest is:**
   (A) 10% (B) 50% (C) 75% (D) 100%
10. $(101)_2 \times (10)_2 =$
    (A) $(1000)_2$ (B) $(1010)_2$ (C) $(1001)_2$ (D) $(1111)_2$

Answers:

1. C	2. A	3. A	4. B	5. D	6. C	7. A	8. C	9. D	10. B

Subjective Type

Business Mathematics (Intermediate Part-I, Class 11th) 1st A 324 Paper I
(Commerce Group)

Time : 1:45 Hours Marks: 40

Note: Section-I is compulsory. Attempt any Two (2) questions from Section-II.

SECTION - I

Q2. Write short answers to any SIX questions: (2×6=12)

(i) **Distribute Rs. 1000 between two students in the ratio of 2 : 3**

Sol. Given ratio 2 : 3

Sum of ratio $2 + 3 = 5$

$$\text{1st share} = \frac{1000}{5} \times 2 = 400$$

$$\text{2nd share} = \frac{1000}{5} \times 3 = 600$$

(ii) Find x if 14 : 19 : : x : 38

Sol. $\frac{14}{19} = \frac{x}{38}$

$14 \times 38 = 19x \Rightarrow x = \frac{14 \times 38}{19} = \frac{532}{19} = 28$

(iii) 250 is 20% of what?

Sol. Means a = 20 , c = 250 and b = ?

Using the formula of abc i.e., ab = 100c

$$20b = 100 \times 250 \Rightarrow b = \frac{100 \times 250}{20} = 1250$$

(iv) Find simple interest on Rs. 8000 at 10% p.a. for 40 days.

Sol.

$P = \text{Rs. } 8000$

$I = 10\% = 0.1 \text{ per annual}$

$N = 40 \text{ days} = \frac{40}{365} = 0.1095 \text{ years}$

As $S.I = PIN$

$= (8000)(0.1)(0.1095)$

$= \text{Rs. } 87.67$

(v) Define ordinary annuity.

Ans. If every payment is made at end of each payment period and continues for a definite period is called ordinary annuity. It can be calculate as:

$$S = R\left[\frac{(1+i)^n - 1}{i}\right]$$

(vi) Solve the equation $2x + 3 = 6 - (2x - 3)$

Sol.

$2x + 3 = 6 - (2x - 3)$

$2x + 3 = 6 - 2x + 3$

$2x + 3 = 9 - 2x$

$2x + 2x = 9 - 3$

$4x = 6$

$2x = 3$

$x = \frac{3}{2}$

(vii) Solve for x : $\frac{5x+4}{3x+2} = \frac{3}{5}$

Sol. $\frac{5x+4}{3x+2} = \frac{3}{5}$

By cross multiplication

$(5x + 4)(5) = 3(3x + 2)$

$25x + 20 = 9x + 6$

$25x - 9x = 6 - 20$

$16x = -14$

$8x = -7$

$x = \frac{-7}{8}$

(viii) What are the methods to solve quadratic equation?

Ans. Ther are three methods to solve the quadratic equation.

(i) By factorization

(ii) By quadratic

(iii) By completing square

(ix) **Solve $4x^2 + 7x - 1 = 0$ by using quadratic formula.**

Sol. $4x^2 + 7x - 1 = 0 \Rightarrow a = 4, b = 7, c = -1$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(7) \pm \sqrt{(7)^2 - 4(4)(-1)}}{2(4)}$$

$$x = \frac{-7 \pm \sqrt{49 + 16}}{7} \Rightarrow S.S = \left\{\frac{-7 \pm \sqrt{65}}{8}\right\}$$

Q3. Write short answers to any SIX questions: **(2×6=12)**

(i) **Find the domain of function $f(x) = 3x - 7$**

Sol. The given function $f(x) = 3x - 7$ is defined for all values of set of real number

So, Domain = set of read number

OR

$= \mathbb{R}$

(ii) **Draw the graph of $f(x) = 2x - 3$**

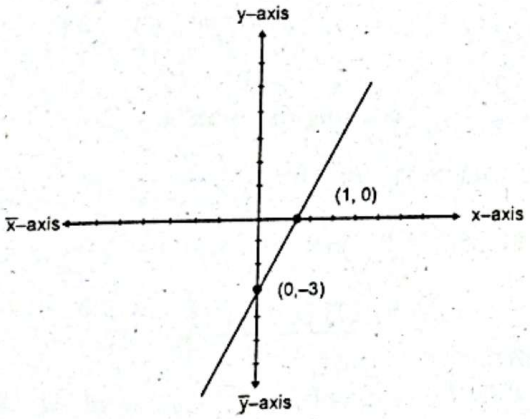
Sol. $f(x) = 3x - 3$

Let $y = f(x)$

So $y = 3x - 3$

X-intercept	Y-intercept
put $y = 0$	put $x = 0$
$3x - 3 = 0$	$y = -3$
$x = \frac{3}{3} = 1$	$\Rightarrow (0, -3)$
$\Rightarrow (1, 0)$	

Graph



(iii) **Convert $(421)_{10}$ to Binary Number System.**

Sol.

2	421		
2	210	—	1
2	105	—	0
2	52	—	1
2	26	—	0
2	13	—	0
2	6	—	1
2	3	—	0
	1	—	1

So $(421)_{10} = (110100101)_2$

(iv) **Convert $(11111)_2$ to Decimal Number System.**

Sol. $(11111)_2$

$= 1 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$

$= 1 \times 16 + 1 \times 8 + 1 \times 4 + 1 \times 2 + 1 \times 1$

$= 16 + 8 + 4 + 2 + 1 = 31$

(v) **Add $(1011)_2$, $(1100)_2$**

Sol.
$$\begin{array}{r} (1011)_2 \\ + \quad (1100)_2 \\ \hline (10111)_2 \end{array}$$

(vi) **Define "Matrix"**

Ans. The arrangement of numbers into m-rows and n-columns is called a matrix.

Example: $\begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix}$

(vii) **If** $A = \begin{bmatrix} 1 & 2 \\ -3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 3 \\ 5 & -2 \end{bmatrix}$. **Find A + B**

Sol. Given

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

$$A+B = \begin{bmatrix} 1 & 2 \\ -3 & 4 \end{bmatrix} + \begin{bmatrix} 0 & 3 \\ 5 & -2 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 5 \\ 2 & 2 \end{bmatrix}$$

(viii) **If** $A = \begin{bmatrix} 4 & -4 \\ -6 & 4 \end{bmatrix}$. **Find** $|A|$.

Sol. Given: $A = \begin{bmatrix} 4 & -4 \\ -6 & -5 \end{bmatrix}$

$$|A| = \begin{vmatrix} 4 & -4 \\ -6 & -5 \end{vmatrix} = (4)(-5) - (-4)(-6) = -20 - 24 = -44$$

(ix) **Find the value of x , if** $\begin{bmatrix} 2 & x \\ 5 & 10 \end{bmatrix}$ **is a singular matrix.**

Sol. The condition for singular matrix is: $|A| = 0$

So, $\begin{vmatrix} 2 & x \\ 5 & 10 \end{vmatrix} = 2(10) - 5(x) = 0 \Rightarrow 20 - 5x = 0 \Rightarrow -5x = -20 \Rightarrow x = \frac{-20}{-5} = 4$

SECTION - II

Note: **Attempt any TWO (2) questions.** **$2 \times 8 = 16$**

Q4 **(a) A family spends Rs. 4004 for food out of total income of Rs. 15400. How much money is needed for food if such family earns Rs. 18,000?** 4

Sol. Given that

Current income = Rs 15400

Current expenditure on food = Rs 4004

Percentage of income spet on food $= \frac{4004}{15400} \times 100$

$= 26\%$

So the family spends 26% of their income on food.

Now, we need to find 26% of Rs 18000:

Required expenditure on food = 26% of 18000

$= \frac{26}{100} \times 18000$

$= \frac{26}{1} \times 180$

$= 4680$

Therefore the family would need Rs 4680 for food if they earn Rs 18000.

(b) **Find compound amount of Rs. 10,000 payable at the end of 8 years at the rate of 6% compounded annually.** 4

Sol. Given Principal = P = Rs. 10,000

n = 8 years

Interest rate = i $= 6\% = \frac{6}{100}$

$= 0.06$ compound annualy

Now Compound Amount $= A = P(1+i)^n$

$= 10{,}000\,(1+0.06)^8$

$= 10000\,(1.06)^8$

= Rs. 15938.48

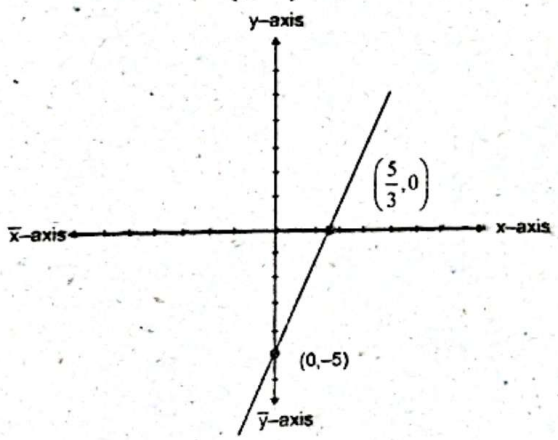
Q5. (a) Find x-intercept, y-intercept and draw the graph of f(x) = 3x – 5 4

Sol. Given $f(x) = 3x - 5$

Let $y = 3x - 5 \quad \therefore \quad y = f(x)$

X - intercept	Y - intercept
put y = 0	put x = 0
$0 = 3x - 5$	$y = 3(0) - 5$
$3x = 5$	$\Rightarrow (0, -5)$
$x = \frac{5}{3}$	
$\Rightarrow \left(\frac{5}{3}, 0\right)$	

Graph



(b) **Solve** $\frac{3}{x-2}+\frac{1}{x+2}=5$ 4

Sol.

$$\frac{3}{x-2}+\frac{1}{x+2} = 5$$

$$\frac{3(x+2)+1(x-2)}{(x-2)(x+2)} = 5$$

$$\frac{3(x+2)+1(x-2)}{x^2+2x-2x-4} = 5$$

$$\frac{3x+6+x-2}{x^2-4} = 5$$

$$\frac{4x+4}{x^2-4} = 5$$

$$4x+4 = 5(x^2-2)$$

$$4x+4 = 5x^2-20$$

$$0 = 5x^2-4x-4-20$$

$$\Rightarrow \quad 5x^2-4x-24 = 0$$

Here $a = 5, b = -4, c = -24$

By quadratic formula

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-(-4) \pm \sqrt{(-4)^2-4(5)(-24)}}{2(5)}$$

$$= \frac{4 \pm \sqrt{16+480}}{10} = \frac{4 \pm \sqrt{496}}{10}$$

$$= \frac{4 \pm 4\sqrt{13}}{10} = \frac{4(1 \pm \sqrt{31})}{10}$$

$$x = \frac{2(1 \pm \sqrt{31})}{5}$$

$$S.S = \left\{\frac{2(1 \pm \sqrt{31})}{5}\right\}$$

Q6. **(a) Solve the system by Crammer's Rule:** $3x+y=1$, $x-2y=-2$ 4

Sol.

$$3x + y = 1$$
$$x - 2y = -2$$

The matrix form is

$$\begin{bmatrix} 3 & 1 \\ 1 & -2 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 \\ -2 \end{bmatrix}$$

Let $Ax = B$

Here $A = \begin{bmatrix} 3 & 1 \\ 1 & -2 \end{bmatrix}$

By crammers rule

$$x = \frac{|A_x|}{|A|} = \frac{\begin{vmatrix} 1 & 1 \\ -2 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ 1 & -2 \end{vmatrix}}$$

$$= \frac{(-2+2)}{-6-1} = \frac{0}{-7} = 0$$

And $$y = \frac{|A_y|}{|A|} = \frac{\begin{vmatrix} 3 & 1 \\ 1 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 1 \\ 1 & -2 \end{vmatrix}}$$

$$\frac{-6-1}{-6-1} = \frac{-7}{-7}$$

$$y = 1$$

(b) Simplify $(11011)_2 \times (11110)_2$ 4

Sol.

$$\begin{array}{cccccccccc}
 & & & & & (1 & 1 & 0 & 1 & 1)_2 \\
 & & & & \times & (1 & 1 & 1 & 1 & 0)_2 \\
\hline
 & & & & & 0^1 & 0^1 & 0 & 0 & 0 \\
 & & & & 1^2 & 1 & 0 & 1 & 1 & \times \\
 & & & 1^2 & 1 & 0 & 1 & 1 & \times & \times \\
 & & 1^2 & 1 & 0 & 1 & 1 & \times & \times & \times \\
 & 1^2 & 1 & 0 & 1 & 1 & \times & \times & \times & \times \\
\hline
(1 & 1 & 0 & 0 & 1 & 0 & 1 & 0 & 1, & 0)_2
\end{array}$$