

Iqra National University
Subject : Basic Mathematics

Submitted by: Ilyas Rehmani

Submitted to: Sir Raza Ahmed

Id: 15719

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Question No 1

(a) Divide $x^3 + 6x^2 + 11x + 6$ by $(x+3)$.

Solution:-

$$\begin{array}{r} x+3 \overline{) x^3 + 6x^2 + 11x + 6} \\ \underline{- x^3 \quad - 3x^2} \\ 3x^2 + 11x + 6 \\ \underline{- 3x^2 \quad - 9x} \\ 2x + 6 \\ \underline{- 2x \quad - 6} \\ 0 \end{array}$$

(b) Factorize $6x^2 + 23x + 7$

$$6x^2 + 2x + 21x + 7$$

$$2x(3x+1) + 7(3x+1)$$

$$(2x+7)(3x+1)$$

(c) Simplify The following

$$\frac{4}{x+2} + \frac{7}{x^2+3x+2}$$

$$\frac{4}{x+2} + \frac{7}{x^2+3x+2}$$

$$\frac{7}{x^2+3x+2} = \frac{-4}{x+2}$$

$$(x+2)7 = -4(x^2+3x+2)$$

$$7x+14 = -4x^2-12x-8$$

$$7x+12x+4x^2 = -8-14$$

$$4x^2+19x = -22$$

Question No 2:

(a) Change the fraction $\frac{27}{2}$ in to
the equivalent decimal. Also find
its Percentage?

$$\begin{array}{r} 13.5 \\ 2 \overline{) 27.0} \\ \underline{-6} \\ 7 \\ \underline{-6} \\ 10 \\ \underline{10} \\ \cdot X \end{array}$$

13.5

Percentage :-

Percentage :-

$$13.5 \times 100 = 1350$$

1350%

(b) What Percent of 450 is 18?

Assume 'x' is the value looking for

If 100% equals 450 so

$$100\% = 450$$

And we can write

$$x\% = 18$$

We have simple equations

$$100\% = 450 \rightarrow \textcircled{1}$$

$$x\% = 18 \rightarrow \textcircled{2}$$

We can write these equations

$$\frac{100\%}{x\%} = \frac{450}{18}$$

$$\left(\frac{100}{x}\right) x = \left(\frac{450}{18}\right) x$$

$$100 = 25x$$

$$\frac{100}{25} = x \Rightarrow x = 4$$

Now

18 is 4% of 450.

(c) An item is sold for R.s 1500.

the gross profit is $\frac{2}{3}$ of the cost
what are the cost and the gross
Profit?

Let the cost Price of the item be R.s. x

Then we have

$$\text{Gross profit} = \frac{2}{3}x$$

$$\text{Selling Price} = \text{R.s. } 1500$$

So we get

$$x + \frac{2}{3}x = 1500$$

$$\Rightarrow \frac{5}{3}x = 1500$$

$$\underline{5}x = 4500$$

$$x = \frac{4500}{5} \Rightarrow x = 900$$

Therefore, the gross Profit is

$$\frac{2}{3} \times 900 = 600$$

Thus

$$\text{cost Price} = \text{Rs. } 900 \text{ Ans}$$

$$\text{Gross Profit} = \text{Rs. } 600 \text{ Ans}$$

QuestionNO 3:

(a) Find AB and BA given that

$$A = \begin{bmatrix} 2 & 4 & 7 \\ 5 & 3 & 1 \end{bmatrix}$$

$$B = \begin{bmatrix} 3 & 9 \\ 2 & 4 \end{bmatrix}$$

$$AB = \begin{bmatrix} 2 & 4 & 7 \\ 5 & 3 & 1 \end{bmatrix} \begin{bmatrix} 3 & 9 \\ 2 & 4 \end{bmatrix}$$

$$= \begin{bmatrix} 2 & 4 & 7 \\ 5 & 3 & 1 \end{bmatrix} \begin{bmatrix} 3 & 9 \\ 2 & 4 \\ 0 & 0 \end{bmatrix}$$

$$= \begin{bmatrix} 6 + 8 + 0 & 18 + 16 + 0 \\ 15 + 6 + 0 & 45 + 12 + 0 \end{bmatrix}$$

$$AB = \begin{bmatrix} 14 & 34 \\ 21 & 57 \end{bmatrix} \rightarrow \textcircled{1}$$

$$BA = \begin{bmatrix} 3 & 9 \\ 2 & 4 \end{bmatrix} \begin{bmatrix} 2 & 4 & 7 \\ 5 & 3 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 6 + 45 & 12 + 27 & 21 + 9 \\ 4 + 20 & 8 + 12 & 14 + 1 \end{bmatrix}$$

$$= \begin{bmatrix} 51 & 39 & 30 \\ 24 & 20 & 15 \end{bmatrix} \rightarrow \textcircled{2}$$

From equation ① and ②

$$AB \neq BA.$$

(b) Find the value of $\begin{vmatrix} 2 & 2 & 0 \\ -2 & 1 & 2 \\ 2 & 1 & 0 \end{vmatrix}$

$$\begin{aligned} \begin{vmatrix} 2 & 2 & 0 \\ -2 & 1 & 2 \\ 2 & 1 & 0 \end{vmatrix} &= 2(1-2) - 2(0-4) + 0(-2-2) \\ &= 2(-1) - 2(-4) + 0 \\ &= -2 + 8 = 6 \text{ Ans.} \end{aligned}$$

(c) Solve the following by using Determinant

$$3x + y = 5$$

$$6x - y = 6$$

$$D = \begin{vmatrix} 3 & 1 \\ 6 & -1 \end{vmatrix} = (-3) - 6 = -9$$

$$D_x = \begin{vmatrix} 5 & 1 \\ 6 & -1 \end{vmatrix} = (-5) - 6 = -11$$

$$D_y = \begin{vmatrix} 3 & 5 \\ 6 & 6 \end{vmatrix} = 18 - 30 = -12$$

$$\frac{D_x}{D} = \frac{-11}{-9} = \frac{11}{9}$$

$$\frac{D_y}{D} = \frac{-12}{-9} = \frac{4}{3}$$

Question No 4:

Solve the equations simultaneous by substitution method and draw lines graph.

$$2x + y + z = 5 \rightarrow \textcircled{1}$$

$$3x - 2y - z = 11 \rightarrow \textcircled{2}$$

$$3x + y + 2z = 11 \rightarrow \textcircled{3}$$

Subtract equation $\textcircled{2}$ and $\textcircled{3}$

$$\begin{array}{r} 3x - 2y - z = 11 \\ -3x + y + 2z = 11 \\ \hline \end{array}$$

$$-3y - 3z = 0$$

$$-3y = 3z$$

$$y = -z \rightarrow A$$

$$z = -y \rightarrow B$$

Put $y = -z$ in eq (1)

$$2x - z + z = 5$$

$$2x = 5 \Rightarrow x = \frac{5}{2}$$

Put $x = \frac{5}{2}$ in eq (3) and

$$z = -y \text{ in eq (3)}$$

$$3\left(\frac{5}{2}\right) + y + 2(-y) = 11$$

$$\frac{15}{2} + y - 2y = 11$$

$$\frac{15}{2} - y = 11$$

$$15 - 2y = 22$$

$$-2y = 22 - 15$$

$$-2y = 7$$

$$y = -\frac{7}{2}$$

As $z = -y$

$$z = -\left(-\frac{7}{2}\right)$$

$$z = \frac{7}{2}$$

