Mid Term Assignment (Spring 2020)

Program: MBA-90

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Course: Business Mathematics & Statistics

Lecturer Name: Dr. Liaqat Ali

Assignment Submitted By: Ali Latif Awan

Roll No: 15319

i   The solutions of $\left|2x - \frac{-3}{5}\right| = -3$

Answer: (d) none of them   because absolute value is always positive so $\left|2x - \frac{-3}{5}\right| = -3$ is not possible for any x

ii A man is going from the point $A(-5, -4)$ to the point $B(-2, 7)$ then the increments in the x- and y-coordinates   are

Answer: (b) $\Delta x = 3, \Delta y = 11$ $\Delta x = x_2 - x_1 = -2 - (-5) = 3$

$$\Delta y = y_2 - y_1 = 7 - (-4) = 11$$

iii   A stair make an angle of inclination $\theta = 45^0$ with the horizontal then its slope is

Answer: (d) none of them because slope $= \tan 45° = 1$

iv   A painter can paint 100 m^2 wall in 10 hours. Then the time required to paint 4000 m^2 wall will be.

Answer: (e) None of them   because $\frac{100}{10} = \frac{4000}{x} \Rightarrow 100x = 40000 \Rightarrow x = 400 \; hours$

v If 20% of sale price $400 is equal to 50% of cost price then the cost price will be

Answer: (d) None of Them because $\frac{20}{100}(400) = \frac{50}{100}x \Rightarrow 80 = \frac{5}{10}x \Rightarrow x = 160 \; cost \; price$

vi If $f(x) = x - 1$ and $g(x) = x^2$ then $(fog)(x) =$ is

Answer: $f(g(x)) = f(x^2) = x^2 - 1$

vii The domain of a curve $y = \sqrt{-1 - x^2}$ is (a) $(-1, 1)$ (b) $[-1, 1)$ (c) $(-1, 1]$ (d) $[-1, 1]$ (e) None of them

Answer: (e) None of them because for each x (either negative or positive or 0) this function is undefined

viii   The net cost equivalent for $10/30$ (a) .72 (b) .56 (c) .44 (d) .11 (e) None of them

Answer: (e)   None of them   because $\frac{10}{30} = 0.33$

ix   The equation P(x)= R(x)-C(x).

Answer: Linear Profit Function

x The sum of two numbers is 30 and difference is 10 then the numbers are

Answer: (e) None of them because $x + y = 30$ and $x - y = 10$ by solving simultaneously these equations we get $x = 20, y = 10$

(Part –II)

Question No.2

   a. A group bonus is divided among 4 employees in the ratio of their basic salaries. Ratio is 7, 4, 2 and 5 respectively. If a total bonus is Rs. 540; calculate the amount received by each employee.

      Solution: Given the bonus =540 Rs.

      Then the ratio of the amount divided into employees is $7:4:2:5$.

      The amount first person got $=\frac{7}{18}(540) =210$ Rs.

      The amount second person got $=\frac{4}{18}(540) = 120\ Rs.$

      The amount third person got $=\frac{2}{18}(540) = 60\ Rs.$

      The amount fourth person got $=\frac{5}{18}(540) = 150\ Rs.$

   b. Solve for x in the following equation
      $(x^2 - 4) \div (x + 2) \times (4x - 2) \div 2 = x$

      Solution: $\dfrac{x^2-4}{x+2} \times \dfrac{4x-2}{2} = x$

      $\Rightarrow \dfrac{(x+2)(x-2)}{(x+2)} \times \dfrac{2(2x-1)}{2} = x$

      $\Rightarrow (x - 2) \times (2x - 1) = x$

      $\Rightarrow (x - 2) \times (2x - 1) = x$

      $\Rightarrow 2x^2 - x - 4x + 2 = x$

      $\Rightarrow 2x^2 - 5x + 2 = x$

      $\Rightarrow 2x^2 - 5x - x + 2 = x$

      $\Rightarrow 2x^2 - 6x + 2 = 0$

      $\Rightarrow x^2 - 3x + 1 = 0$ Solving by using quadratic formula

      $\Rightarrow x = \dfrac{3 \pm \sqrt{9-4}}{2}$

      $\Rightarrow x = \dfrac{3 \pm \sqrt{5}}{2}$

      $\Rightarrow solution\ set = \{\dfrac{3 \pm \sqrt{5}}{2}\}$

a. The sum of the ages of a girl and her brother is 60 years. Two years ago her age was three times the age of her brother. Find the present age of girl and her brother.

Solution: Let the age of girl $=x$ years
And the age of brother $=y$ years

Then $x + y = 26$
$\Rightarrow x = 26 - y$ ………(i)
Three years ago $(x - 3) = 4(y - 3)$
$\Rightarrow x - 3 = 4y - 12$
$\Rightarrow x - 4y = 3 - 12$
$\Rightarrow x - 4y = -9$ ……….(ii)
Putting (i) in (ii)
$(26 - y) - 4y = -9$
$\Rightarrow -5y = -9 - 26$
$\Rightarrow -5y = -35$
$\Rightarrow \boxed{y = 7}$

Putting in (i) we get $\boxed{x = 19}$

b. Selling price = $18.75
Cost = $15
Markup based on cost = ?
Percent markup based on cost =?

Solution: Given Selling price =$18.75
Cost = $15

Then $\boxed{Markup = \dfrac{18.75 - 15}{15} = 0.25\$}$

$$\boxed{Percent\ Markup = 0.25 \times 100 = 25\%}$$

a. List price = $150
   Trade discount = 20%
   Find the net cost.

   Solution: Given List Price = $150 and
   Trade discount = 20%

   $$=\frac{20}{100}(150)$$
   $$=30\$$$

   then
   Net Cost = List Price- Trade discount
   $$=\$150-30\$$$

   $$\boxed{Net\ Cost\ =\ 120\$}$$

b. Heat and electricity together cost a company Rs: 1080 for the month of January. If the consumption for heating purposes is three times as much as light, how much each expense cost to the company?

   Solution: Let the cost of Heat =H
   And   the cost of Electricity =E
   Then   H+E=1080 …..(i)
   And   3E=H
                i.e. H=3E ……..(ii)
   Putting (ii) in (i)   we get
                3E+E=1080
   $\Rightarrow 4E = 1080$
   $\Rightarrow \boxed{E = 270}$ Putting in (ii) we get

   $$\boxed{H = 810}$$

a. 4 men and 6 boys can finish a piece of work in 5 days while 3 men and 4 boys can finish it in 7 days. Find the time taken by 1 man alone or than by 1 boy alone.

Solution: Let the time taken by Men=x

And the time taken by boy =y

Then $\quad \dfrac{4}{x} + \dfrac{6}{y} = \dfrac{1}{5}$ ....(i) and

$\qquad \dfrac{3}{x} + \dfrac{4}{y} = \dfrac{1}{7}$ ...... (ii)

Let $u = \dfrac{1}{x}$ and $v = \dfrac{1}{y}$

Then (i) and (ii) $\implies 4u + 6v = \dfrac{1}{5}$ ......(iii)

$\qquad\qquad\qquad\qquad 3u + 4v = \dfrac{1}{7}$ ......(iv)

$3(iii) - 4(iv) \implies$

$$12u + 18v = \dfrac{3}{5}$$

$$\pm 12u \pm 16v = \pm\dfrac{4}{7}$$

$$2v = \dfrac{1}{35}$$

$\implies v = \dfrac{1}{70}$ .....(v)

$\implies \boxed{y = 70 \; days}$

Putting (v) in (iii) we get $\quad 4u + 6\left(\dfrac{1}{70}\right) = \dfrac{1}{5}$

$\implies 4u + \dfrac{3}{35} = \dfrac{1}{5}$

$\implies 4u = \dfrac{1}{5} - \dfrac{3}{35}$

$\implies 4u = \dfrac{7-3}{35}$

$\implies 4u = \dfrac{4}{35}$

$\implies u = \dfrac{1}{35}$

$\implies \boxed{x = 35\ days}$

b. List price = $150

Trade discount = 20%

Find the net cost.

Solution: Given List Price = $150 and

Trade discount = 20%

$$= \frac{20}{100}(150)$$
$$=30\$$$

Then

Net Cost = List Price- Trade discount
$$=\$150-30\$$$

$$\boxed{Net\ Cost\ = 120\$}$$