

Section B - (SS 2023)

Q.6.(a)

A telephone company charges initially Rs. 0.50 and then Rs. 0.11 for every minute. Write an expression that gives the cost of a call that last N minutes.

Sol

Let the initial charge represented as " a_0 "

$$\text{f.e. } a_0 = 0.50 \text{ Rs.}$$

For next minute we add ($a_1 = \text{Rs } 0.11$) to the previous bill

$$\begin{aligned} \text{That is, } a_0 + a_1 &= 0.50 + 0.11 \\ &= 0.61 \end{aligned}$$

For next minute:

$$\begin{aligned} a_0 + a_1 + a_1 &= a_0 + 2(a_1) \\ &= 0.50 + 2(0.11) \end{aligned}$$

$$= 0.72$$

For next minute

$$\begin{aligned} a_0 + a_1 + a_1 + a_1 &= a_0 + 3(a_1) \\ &= 0.50 + 3(0.11) \\ &= 0.83 \end{aligned}$$

Therefore, in the same manner we can deduce the general expression for N minutes as:

$$a_N = a_0 + N(a_1)$$

where N = no. of minutes

a_0 = initial rupees charged

a_1 = rupees per minute.

Q.6.(b) Find the missing number in the series below

(i) 1, 8, 4, 27, 9, ?

Sol

1, $(2)^3$, $(2)^2$, $(3)^3$, $(3)^2$, $(4)^3$

Therefore ans. is 64.

(ii) 3, 6, 8, 16, 18, ?

$$3 \times 2 = 6, \quad 8 \times 2 = 16, \quad 18 \times 2 = 36$$

\therefore 3, 6, 8, 16, 18, 36

(iii) 2, 8, 512, ?

$$(2)^3 = 8, \quad (8)^3 = 512, \quad (512)^3 = 134217728$$

(iv) 81, 9, 64, 8, ?, 12

$$9 \times 9 = 81, \quad 8 \times 8 = 64, \quad 12 \times 12 = 144$$

\therefore 81, 9, 64, 8, 144, 12

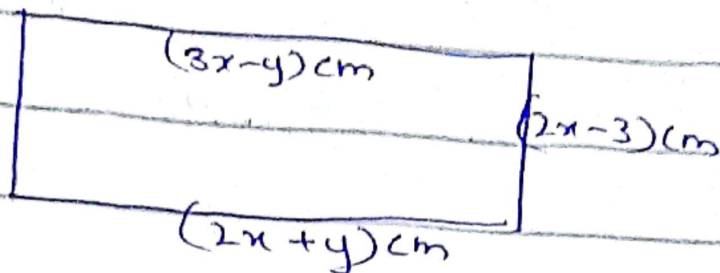
(v) 6, 11, 21, 36, 56

$$6 + 5 = 11, \quad 11 + 10 = 21, \quad 21 + 15 = 36$$

$$36 + 20 = 56, \quad 56 + 25 = 81$$

\therefore 6, 11, 21, 36, 56, 81

(1) The perimeter of the rectangle given below is 114cm. Find the area of the rectangle.



Sol: Perimeter = Sum of all the sides

$$114 = 2(2x-3) + 2x+y + 3x-y$$

$$114 = 4x-6 + 2x+y + 3x-y$$

$$114 = 9x-6$$

$$9x = 114+6$$

$$x = \frac{120}{9} = \frac{40}{3}$$

$$x = \frac{40}{3}$$

$$\Rightarrow 3x-y = 2x+y$$

$$\Rightarrow x = 2y$$

$$20\frac{40}{3} = 2y$$

$$\Rightarrow y = \frac{20}{3}$$

Area of rectangle = length \times breadth

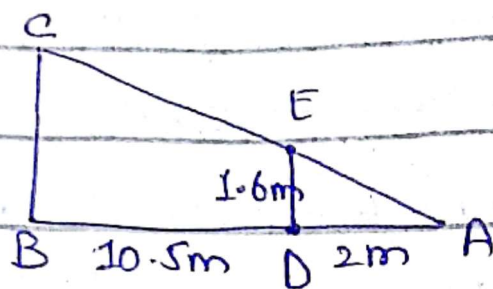
$$= \left[2\left(\frac{40}{3}\right) - 3 \right] \times \left[3\left(\frac{40}{3}\right) - \frac{20}{3} \right]$$

$$= \left[\frac{80}{3} - 3 \right] \times \left[40 - \frac{20}{3} \right]$$

$$= \frac{71}{3} \times \frac{100}{3}$$

$$= 788.8 \text{ cm}^2$$

Ahmad stands at point D, 2m
 in front of a spotlight at
 point A. He is 1.6m tall and is
 facing the wall of a building
 which is 10.5m away from him.
 How tall (BC) is his shadow
 on the wall of the building.



Sol Let the shadow on the
 wall represented as x .

Since $\triangle ADB$ and $\triangle ABC$
 are similar their corresponding
 sides have equal ratios.

$$\text{i.e., } \frac{2}{10.5} = \frac{1.6}{x}$$

$$2x = 16.8$$

$$x = 8.4$$