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CSS-2023 (Ability)

Q6.(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 lasts N minutes.

Given Data:

Initial cost = Rs. 0.50

Per minutes charges = 0.11 Rs.

To find:

Charges for N minutes = ? = x

Solution:

Fixed charges = 0.50 Rs

charges for 1 minute = 0.50 + 0.11

charges for N minutes = $x = N(0.50 + 0.11)$

The expression will be

$$x = N(0.50 + 0.11)$$

B. Find missing numbers in the series below.

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

first number = 1

second " = 8 = $(2)^3$

third number = 4 = $(2)^2$

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$$4^{\text{th}} \text{ number} = 27 = (3)^3$$

$$5^{\text{th}} \text{ number} = 9 = (3)^2$$

$$6^{\text{th}} \text{ number} = ?$$

$$\text{Series: } 1, (2)^3, (2)^2, (3)^3, (3)^2$$

following the series 6th number is $(4)^3$

$$\boxed{x = 64}$$

2) $3, 6, 8, 16, 18, ?$

$$\text{First number} = 3 = a_1$$

$$\text{Second number} = a_1 \times 2 = a_2 = 6$$

$$\text{Third number} = a_3 = a_2 + 2 = 8$$

$$\text{Fourth number} = a_4 = a_3 \times 2 = 16$$

$$\text{Fifth number} = a_5 = a_4 + 2 = 18$$

Sixth number according to series should

$$\text{be } a_6 = a_5 \times 2 = 18 \times 2$$

$$\boxed{a_6 = 36}$$

3) $2, 8, 512$

$$\text{first number} = 2 = a_1$$

$$\text{Second number} = (a_1)^3 = 8 = a_2$$

$$\text{Third number} = (a_2)^3 = (8)^3 = 512 = a_3$$

Following the series fourth number = $a_4 = (a_3)^3$

$$a_4 = (512)^3 \Rightarrow (512 \times 512 \times 512)$$

$$a_4 = 134, 217, 728$$

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4) 81, 9, 64, 8, ?, 12

$$\text{First number} = a_1 = 81$$

$$\text{Second number} = \sqrt{a_1} = 9 = a_2$$

$$\text{Third number} = a_3 = 64$$

$$\text{Fourth number} = a_4 = \sqrt{a_3} = 8$$

$$\text{Fifth number} = a_5 = ?$$

$$\text{Sixth number} = a_6 = \sqrt{a_5} = 12$$

From the above series

$$(\sqrt{a_5})^2 = (12)^2$$

$$\boxed{a_5 = 144}$$

5) 6, 11, 21, 36, 56, ?

$$\text{First number} = a_1 = 6$$

$$\text{Second number} = a_2 = a_1 + 5 = 11$$

$$\text{Third number} = a_3 = a_2 + 10 = 21$$

$$\text{Fourth number} = a_4 = a_3 + 15 = 36$$

$$\text{Fifth number} = a_5 = a_4 + 20 = 56$$

Series will be

$$a_1 \xrightarrow{+5} a_2 \xrightarrow{+10} a_3 \xrightarrow{+15} a_4 \xrightarrow{+20} a_5 \xrightarrow{+25} a_6$$

$$\text{Sixth number will be} = a_6$$

$$a_6 = a_5 + 25$$

$$= 56 + 25$$

$$\boxed{a_6 = 81}$$

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

Given:

$$\text{Perimeter} = 114 \text{ cm}$$

To find:

$$\text{Area} = ?$$

Calculations =

Parallel lines of a rectangle are equal, hence

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

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

$$x = 2y$$

Perimeter = $2(l + w)$ or sum of all sides

$$114 \text{ cm} = 2((2x - 3) + (2x - 3) + (3x - y) + (2x + y))$$

$$114 \text{ cm} = 2x - 3 + 2x - 3 + 3x - y + 2x + y$$

$$114 \text{ cm} = 9x - 6$$

$$9x = 114 + 6 \Rightarrow 120$$

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

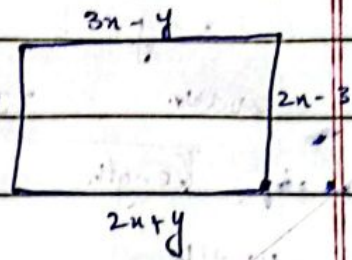
$$x = 13.33 \text{ cm}$$

put value of x in (i)

$$13.33 = 2y$$

$$y = \frac{13.33}{2}$$

$$y = 6.65 \text{ cm}$$



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$$3x - y = 3(13.33) - 6.65$$

$$\text{length} = 33.33 \text{ cm}$$

$$2x + y = 2(13.33) + 6.65$$

$$\text{width} = 33.33$$

$$\text{Length} = 33.33$$

$$\text{width} =$$

$$2x - 3 = 2(13.33) - 3$$

$$= 23.66$$

$$\text{Area} = L \times w$$

$$= 33.33 \times 23.66$$

$$\text{A} = 788.5878 \text{ cm}^2$$

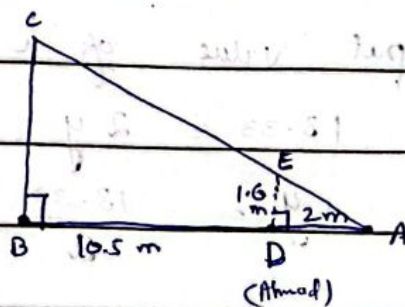
D1 Ahmed stands at point D, 2m in front of a spotlight at point A. He is 1.6m tall and is facing the wall of a building which is 10.5m away from him. How tall is his shadow on the wall of building.

Given-

$$BD = 10.5 \text{ m} \quad ; \quad AD = 2 \text{ m}$$

$$AB = 2 + 10.5 = 12.5 \text{ m}$$

$$ED = 1.6 \text{ m}$$



To find:

$$BC = ?$$

Two triangle ABC and ADE are similar.

$$\frac{AD}{AB} = \frac{DE}{BC} \rightarrow (i)$$

Putting values in (i)

$$\frac{2}{12.5} = \frac{1.6}{BC}$$

$$BC = \frac{1.6 \times 12.5}{2}$$

$$BC = 1.6 \times 6.25$$

$$BC = 10 \text{ m}$$

The shadow is 10 m tall.