

Exercise 1.3

Monday, April 27, 2026 9:25 PM

Question No.1: The sum of three consecutive integers is forty-two, find the three integers.

Solution:

Let required integers are x , $x+1$ and $x+2$.

Given that:

$$x + (x+1) + (x+2) = 42$$

$$\Rightarrow x + x+1 + x+2 = 42$$

$$\Rightarrow 3x + 3 = 42$$

$$\Rightarrow 3x = 42 - 3$$

$$\Rightarrow 3x = 39$$

$$\Rightarrow x = \frac{39}{3}$$

$$\Rightarrow x = 13$$

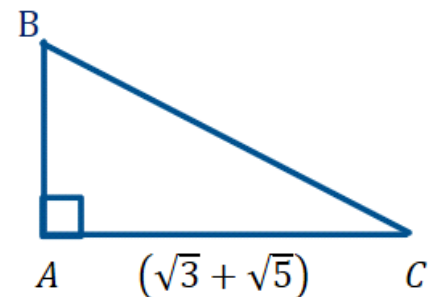
$$\Rightarrow \text{First integer} = x = 13$$

$$\text{Second integer} = x + 1 = 13 + 1 = 14$$

$$\text{Third integer} = x + 2 = 13 + 2 = 15$$

Question No.2: The diagram shows right angled $\triangle ABC$ in which the length of $\overline{AC}$ is $(\sqrt{3} + \sqrt{5})$ cm. The area of

$\triangle ABC$ is $(1 + \sqrt{15})$ cm^2 . Find the length $\overline{AB}$ in the form $(a\sqrt{3} + b\sqrt{5})$ cm, where a and b are integers.



Solution:

$$\text{length of } \overline{AC} = (\sqrt{3} + \sqrt{5}) \text{ cm}$$

$$\text{Area of } \triangle ABC = (1 + \sqrt{15}) \text{ cm}^2$$

But;

$$\text{Area of } \triangle ABC = \frac{1}{2} \times \text{base} \times \text{height}$$

$$\Rightarrow (1 + \sqrt{15}) = \frac{1}{2} \times (\sqrt{3} + \sqrt{5}) \times \overline{AB}$$

$$\Rightarrow \frac{2(1 + \sqrt{15})}{(\sqrt{3} + \sqrt{5})} = \overline{AB}$$

$$\begin{aligned} \Rightarrow \overline{AB} &= \frac{2(1 + \sqrt{15})}{(\sqrt{3} + \sqrt{5})} \\ &= \frac{2(1 + \sqrt{15})}{(\sqrt{3} + \sqrt{5})} \times \frac{(\sqrt{3} - \sqrt{5})}{(\sqrt{3} - \sqrt{5})} \end{aligned}$$

$$= \frac{2(\sqrt{3} - \sqrt{5} + \sqrt{45} - \sqrt{75})}{(\sqrt{3})^2 - (\sqrt{5})^2}$$

$$= \frac{2(\sqrt{3} - \sqrt{5} + \sqrt{9 \times 5} - \sqrt{25 \times 3})}{(\sqrt{3})^2 - (\sqrt{5})^2}$$

$$= \frac{2(\sqrt{3} - \sqrt{5} + 3\sqrt{5} - 5\sqrt{3})}{(\sqrt{3})^2 - (\sqrt{5})^2}$$

$$= \frac{2(-4\sqrt{3} + 2\sqrt{5})}{3 - 5}$$

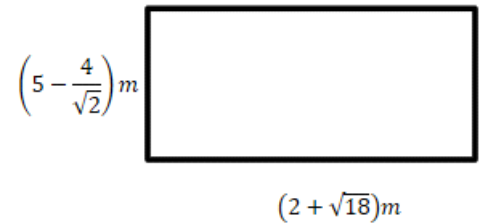
$$= \frac{-2(4\sqrt{3} - 2\sqrt{5})}{-2}$$

$$= 4\sqrt{3} - 2\sqrt{5}$$

Question No.3: A rectangle has sides of length $(2 + \sqrt{18})m$ and $(5 - \frac{4}{\sqrt{2}})m$.

Express the area of rectangle *in the form* $a + b\sqrt{2}$, where a and b are integers.

Solution:



Given that:

$$\text{width} = (5 - \frac{4}{\sqrt{2}})m$$

Area of rectangle = length $\times$ width

$$= (2 + \sqrt{18}) \times (5 - \frac{4}{\sqrt{2}})$$

$$= (2 + \sqrt{9 \times 2}) \times (5 - \frac{2 \times 2}{\sqrt{2}})$$

$$= (2 + 3\sqrt{2}) \times (5 - \frac{2\sqrt{2} \times \sqrt{2}}{\sqrt{2}})$$

$$= (2 + 3\sqrt{2}) \times (5 - 2\sqrt{2})$$

$$= 10 - 4\sqrt{2} + 15\sqrt{2} - 6(\sqrt{2})^2$$

$$= 10 + 11\sqrt{2} - 6 \times 2$$

$$= 10 + 11\sqrt{2} - 12$$

$$= (-2 + 11\sqrt{2})m^2$$

Question No.4: Find two numbers whose sum is 68 and difference is 22.

Solution:

Let 1st number = x

and 2nd number = y

Given that:

$$x + y = 68 \quad \dots \quad (1)$$

$$\& \ x - y = 22 \quad \dots \quad (2)$$

Add (1) & (2):

$$x + y = 68$$

$$x - y = 22$$

$$2x = 90$$

$$\Rightarrow x = \frac{90}{2}$$

$$\Rightarrow \mathbf{x = 45}$$

Put this value in (1):

$$\Rightarrow 45 + y = 68$$

$$\Rightarrow y = 68 - 45$$

$$\Rightarrow \mathbf{y = 23}$$

$$\Rightarrow \text{1st number} = x = 45$$

$$\text{2nd number} = y = 23$$

Question No.5: The weather in Lahore was unusually warm during the summer of 2024. the TV news reported temperature as high as 48°C . By using the formula

$\left(F^{\circ} = \frac{9}{5}C^{\circ} + 32\right)$. Find the temperature as Fahrenheit scale.

Solution:

Given that:

$$F^{\circ} = \frac{9}{5}C^{\circ} + 32$$

$$= \frac{9}{5} \times 48 + 32$$

$$= 86.4 + 32$$

$$= 118.4$$

Temperature as Fahrenheit scale = $118.4 F^0$

Question No.6: The sum of the ages of the father and son is 72 years. Six years ago, the father's age was 2 times the age of the son. What was son's age six years ago?

Solution:

Six Years Ago:

Let age of son = x

Then age of father = 2x

Today:

age of son = x + 6

age of father = 2x + 6

According to given condition:

$$(x+6) + (2x+6) = 72$$

$$\Rightarrow x + 6 + 2x + 6 = 72$$

$$\Rightarrow 3x + 12 = 72$$

$$\Rightarrow 3x = 72 - 12$$

$$\Rightarrow 3x = 60$$

$$\Rightarrow x = \frac{60}{3}$$

$$\Rightarrow x = 20$$

$$\Rightarrow \text{Son's age six years ago} = 20$$

Question No.7: Mirha bought a toy for Rs. 1500 and sold for Rs. 1520. What was her

profit percentage?

Solution:

Cost Price = Rs. 1500

Selling Price = Rs. 1520

Profit = Rs. 1520 – Rs. 1500
= Rs. 20

$$\text{Profit percent} = \frac{20}{1500} \times 100$$

$$= \mathbf{1.33\%}$$

Question No.8: The annual income of Tayyab is Rs. 9,60,000 while the exempted amount is Rs. 1,30,000. How much tax would he have to pay at the rate of 0.75%?

Solution:

Taxable income = Rs. 9,60,000

Exempted amount = Rs. 1,30,000

Taxable income = Rs. 9,60,000 – Rs. 1,30,000
= Rs. 8,30,000

Tax rate = 0.75%

Tax on 100 rupees = 0.75

$$\text{Tax on 1 rupee} = \frac{0.75}{100}$$

$$\text{Tax on 8,30,000 rupee} = \frac{0.75}{100} \times 8,30,000$$

$$= \mathbf{Rs. 6225}$$

