

# FluidMaths

GCSE Mathematics (Grade 9-1)

Problem Solving  
Linear Equations Set 2  
Forming and Solving  
Solutions

**The marks shown are for guidance purposes only**

**The questions are repeated here for your convenience**

- 1 A mobile phone dealer has 50 mobile phones in his shop. He also has some mobile phones in his warehouse. A third of the phones from the warehouse are transferred to the shop. He now has three times as many mobile phones in the shop as in the warehouse.

How many mobile phones does the dealer have altogether?

**Solution**

Let the number of phones in the warehouse be  $x$

So,  $\frac{1}{3}x$  was transferred from the warehouse to the shop

The number of phones in the warehouse is now

$$x - \frac{1}{3}x = \frac{2}{3}x \quad \text{[1mark]}$$

The number of phones in the shop is now  $50 + \frac{1}{3}x$  [1mark]

The number of phones in the shop is now three times the number in the warehouse

$$\text{Therefore, } 50 + \frac{1}{3}x = 3 \times \frac{2}{3}x \quad \text{[1mark]}$$

$$50 + \frac{1}{3}x = \frac{6}{3}x$$

$$150 + x = 6x \quad \text{[1mark]}$$

$$150 = 5x$$

$$x = 30 \quad \text{[1mark]}$$

Therefore, the dealer has  $50 + 30 = 80$  mobile phones [1mark]

- 2 The sum of three positive numbers is 98  
The first number is 16 more than the second number  
The first number is also half of the third number  
Find the 3 numbers.

Solution

Let the 1<sup>st</sup> number be  $n$

Then the 2<sup>nd</sup> number is  $n - 16$

The 3<sup>rd</sup> number is  $2n$

Now add all the expressions

$$n + n - 16 + 2n = 98 \quad \text{[1mark]}$$

$$4n - 16 = 98$$

$$4n = 114$$

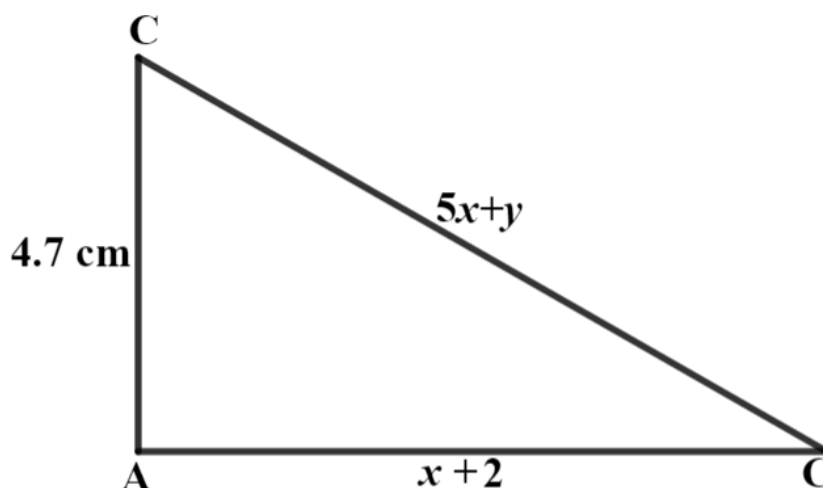
$$n = 28.5 \quad \text{[1mark]}$$

Therefore, the 2<sup>nd</sup> number will be  $28.5 - 16 = 12.5$   
**[1mark]**

So, the 3<sup>rd</sup> will be  $2 \times 28.5 = 57$       **[1mark]**

Hence the three numbers are 28.5, 12.5, 57

3 Triangle ABC is shown below



$$AC = 4.7 \text{ cm}$$

$$AB = x + 2$$

$$BC = 5x + y$$

The area of the triangle is  $16 \text{ cm}^2$

The perimeter of the triangle is  $40.2 \text{ cm}$

Calculate the values of  $x$  and  $y$

Give your answers to 1 decimal place

**Solution**

$$\left\{ \text{Area of a triangle} = \frac{1}{2}bh \right\}$$

$$\text{Therefore, } 16 = \frac{1}{2} \times b \times 4.7$$

$$32 = 4.7b$$

$$b = 6.81 \text{ cm [1mark]}$$

$$\text{This means, } x + 2 = 6.81$$

$$\text{So, } x = 4.8 \text{ cm(1dp) [1mark]}$$

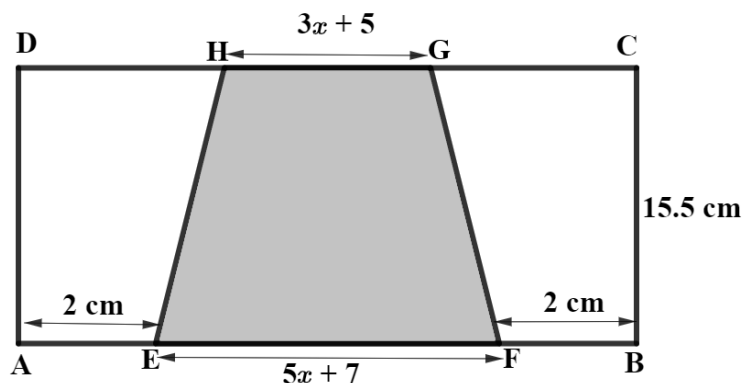
The perimeter of the triangle is

$$4.7 + 6.8 + 5 \times 4.8 + y = 35.5 + y \text{ [1mark]}$$

$$\text{Therefore, } 35.5 + y = 40.2$$

$$\text{Hence, } y = 4.7 \text{ cm [1mark]}$$

- 4 ABCD is a rectangle of area  $403 \text{ cm}^2$   
 EFGH is a trapezium



$$AE = BF = 2 \text{ cm}$$

$$BC = 15.5 \text{ cm}$$

$$EF = 5x + 7$$

$$GH = 3x + 5$$

Calculate the area of the trapezium

**Solution**

The length AB of the rectangle is  $403 \div 15.5 = 26$  [1mark]

The length of the rectangle in terms of  $x$  will be

$$2 + 2 + 5x + 7 = 5x + 11$$

Therefore,

$$5x + 11 = 26 \quad \text{[1mark]}$$

$$5x = 15$$

$$x = 3 \quad \text{[1mark]}$$

Therefore,  $EF = 5 \times 3 + 7 = 22$

Also,  $GH = 3 \times 3 + 5 = 14$  [1mark]

The height of the trapezium is 15.5 cm

The area of a trapezium  $= \frac{1}{2}(a + b)h$

$$A = \frac{1}{2}(22 + 14) \times 15.5 = 279 \text{ cm}^2 \quad \text{[2marks]}$$

- 5 Point A has coordinates  $(n, 2)$   
Point B has coordinates  $(3, 5n)$   
The gradient of line segment AB is 4,  
Calculate the exact value of  $n$ .

**Solution**

Gradient  $m$  is given as  $m = \frac{y_2 - y_1}{x_2 - x_1}$

Therefore, the gradient of line segment AB =  $\frac{5n - 2}{3 - n}$

**[1mark]**

Therefore,  $\frac{5n - 2}{3 - n} = 4$       **[1mark]**

So,  $5n - 2 = 12 - 4n$       **[1mark]**  
 $9n = 14$

Therefore,  $n = \frac{14}{9}$       **[1mark]**