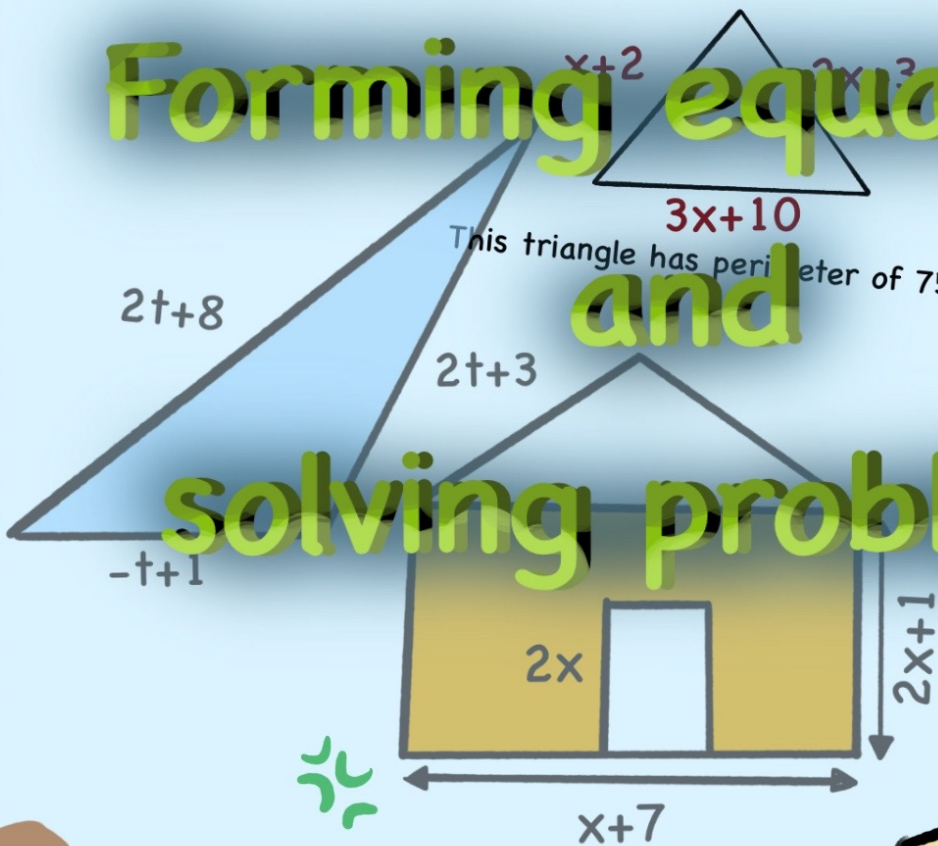


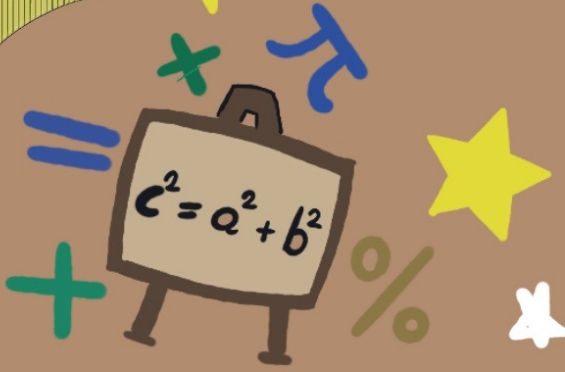
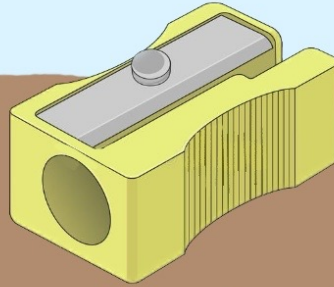
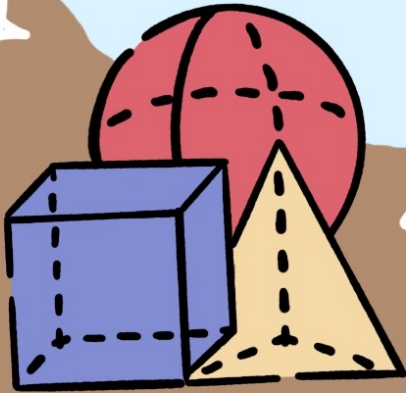
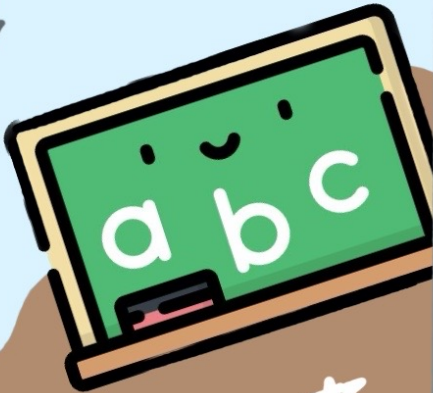
Forming equations

and solving problems

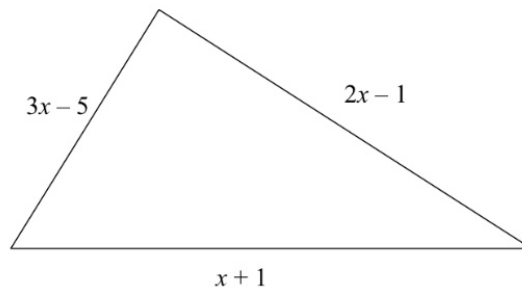


This triangle has perimeter of 75cm

$$\begin{aligned}
 6x + 15 &= 75 \\
 (-15) & \quad (-15) \\
 6x &= 60 \\
 (\div 6) & \quad (\div 6) \\
 x &= 10
 \end{aligned}$$



- 1 The lengths, in cm, of the sides of a triangle are $3x - 5$, $2x - 1$ and $x + 1$



- (a) Write down an expression, in terms of x , for the perimeter of the triangle.

$$\begin{aligned} P &= (3x - 5) + (x + 1) + (2x - 1) \\ &= 3x - 5 + x + 1 + 2x - 1 \\ &= 6x - 5 \end{aligned}$$

$$\underline{\underline{6x - 5}} \text{ cm} \quad (2)$$

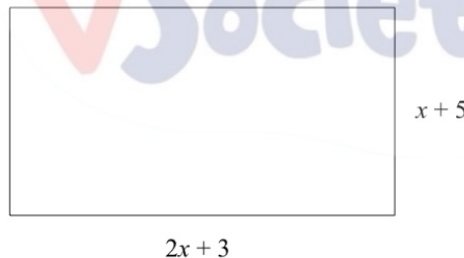
- (b) Work out the value of x .

$$\begin{aligned} 6x - 5 &= 31 \\ 6x &= 31 + 5 \\ 6x &= 36 \\ x &= 6 \end{aligned}$$

$$\underline{\underline{6}} \quad (2)$$

(Total for question 1 is 4 marks)

- 2 A rectangle has a length of $(2x + 3)$ cm and a width of $(x + 5)$ cm.



- (a) Find an expression for the perimeter of the rectangle.

$$\begin{aligned} P &= 2x + 3 + x + 5 + 2x + 3 + x + 5 \\ &= 6x + 16 \end{aligned}$$

$$\underline{\underline{6x + 16}} \text{ cm} \quad (2)$$

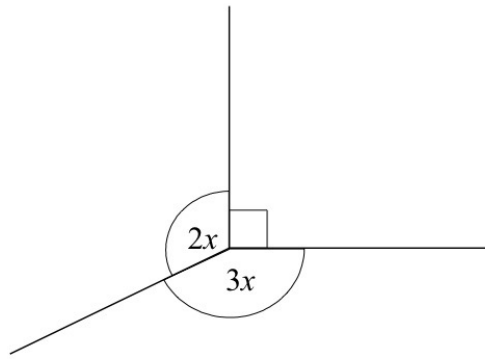
- (b) Given the rectangle has a perimeter of 43 cm find the value of x .

$$\begin{aligned} 6x + 16 &= 43 \\ 6x &= 43 - 16 \\ 6x &= 27 \\ x &= 4.5 \end{aligned}$$

$$\underline{\underline{4.5}} \quad (2)$$

(Total for question 2 is 4 marks)

3



Find the value of x .

$$2x + 3x + 90 = 360$$

$$5x = 360 - 90$$

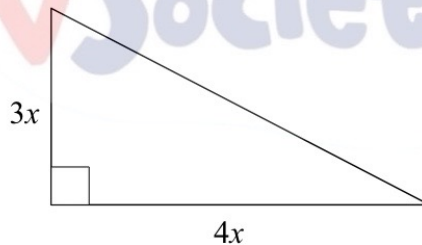
$$5x = 270$$

$$x = 54$$

54

(Total for question 3 is 3 marks)

4 The diagram shows a right angled triangle.



The area of the triangle is 294 cm^2

Work out the value of x .

$$\begin{aligned} \text{area} &= \frac{1}{2} \times b \times h \\ &= \frac{1}{2} \times 4x \times 3x \\ &= 6x^2 \end{aligned}$$

$$294 = 6x^2$$

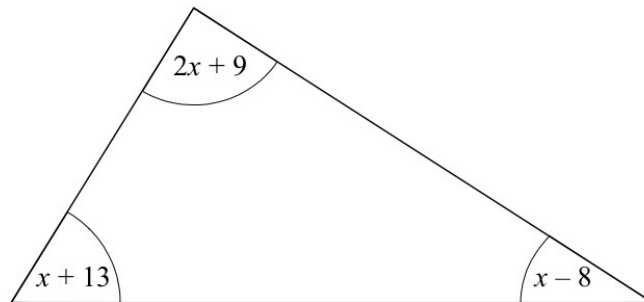
$$x^2 = 49$$

$$x = \sqrt{49} = 7$$

7

(Total for question 4 is 3 marks)

- 5 The sizes of the angles, in degrees, of a triangle are $2x + 9$, $x + 13$ and $x - 8$



Work out the value of x .

$$2x + 9 + x + 13 + x - 8 = 180$$

$$4x = 180 - 9 - 13 + 8$$

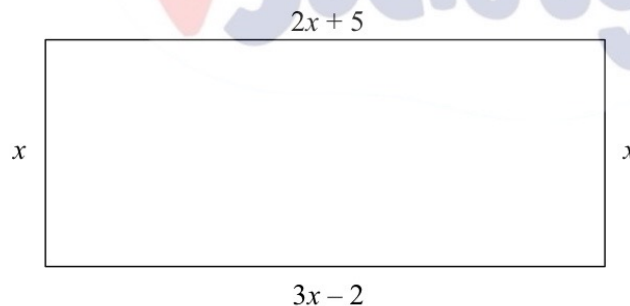
$$4x = 166$$

$$x = 41.5$$

41.5

(Total for question 5 is 3 marks)

- 6 The diagram shows a rectangle.
All measurements are in centimetres.



Find the perimeter of the rectangle.

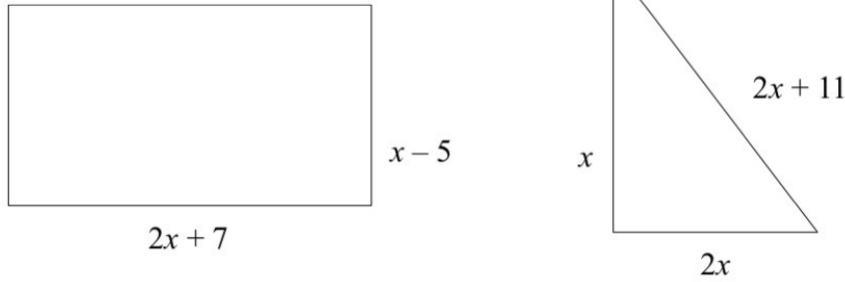
$$P = x + 2x + 5 + 3x - 2 + x$$

$$= 7x + 3$$

$7x + 3$ cm

(Total for question 6 is 3 marks)

- 7 The diagram shows a rectangle and a triangle.



The perimeter of the rectangle is equal to the perimeter of the triangle.

Find the value of x .

$$\begin{aligned} P(r) &= 2x + 7 + 2x + 7 + x - 5 + x - 5 \\ &= 6x + 4 \end{aligned}$$

$$\begin{aligned} P(t) &= x + 2x + 2x + 11 \\ &= 5x + 11 \end{aligned}$$

$$6x + 4 = 5x + 11$$

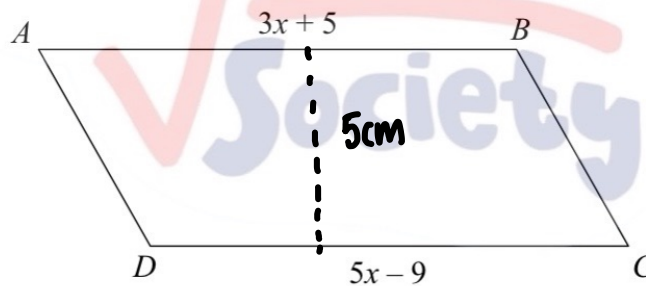
$$6x - 5x = 11 - 4$$

$$x = 7$$

7

(Total for question 7 is 3 marks)

8



$ABCD$ is a parallelogram

All measurements are in centimetres.

The perpendicular height of the parallelogram is 5 cm.

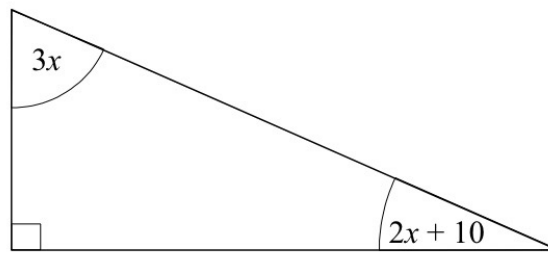
Find the area of $ABCD$

$$\begin{aligned} A &= bh \\ &= (5x - 9) \times 5 \\ &= 25x - 45 \end{aligned}$$

25x - 45

(Total for question 8 is 4 marks)

- 9 The diagram shows a right-angled triangle.
All of the angles are in degrees.



Find the value of size of the smallest angle in the triangle.

$$3x + 2x + 10 + 90 = 180$$

$$5x = 180 - 90 - 10$$

$$5x = 80$$

$$x = 16$$

$$3x = 48$$

$$2x + 10 = (16 \times 2) + 10$$

$$= 42$$

42°

(Total for question 9 is 3 marks)

- 10 Adam has some marbles.
Bradley has twice as many marbles as Adam.
Chris has 5 more marbles than Bradley.

In total they have 55 marbles.

How many marbles does Chris have?

$$\text{Adam} = x$$

$$\text{Bradley} = 2x$$

$$\text{Chris} = 2x + 5$$

$$x + 2x + 2x + 5 = 55$$

$$5x = 50$$

$$x = 10$$

$$\text{Chris} \rightarrow 2(10) + 5$$

$$= 25$$

25

(Total for question 10 is 3 marks)

- 11 The size of the largest angle in a triangle is three times the size of the smallest angle. The other angle is 35° more than the smallest angle.

Work out, in degrees, the size of each angle in the triangle.
You must show your working.

$$\text{smallest} = x$$

$$\text{medium} = x + 35$$

$$\text{largest} = 3x$$

$$x + x + 35 + 3x = 180$$

$$5x = 180 - 35$$

$$5x = 145$$

$$x = 29$$

$$\text{smallest} = 29^\circ$$

$$\text{medium} = 29 + 35 = 64^\circ$$

$$\text{largest} = 3(29) = 87^\circ$$

$$29^\circ, 64^\circ, 87^\circ$$

(Total for question 11 is 5 marks)

- 12 Lucy is three times as old as Alex.
Lucy is 7 years older than Megan.
The sum of their ages is 126.

Find the ratio of Alex's age to Lucy's age to Megan's age.

$$\text{Alex} = x$$

$$\text{Lucy} = 3x$$

$$\text{Megan} = 3x - 7$$

$$x + 3x + 3x - 7 = 126$$

$$7x = 126 + 7$$

$$7x = 133$$

$$x = 19$$

$$\text{Alex} = 19$$

$$\text{Lucy} = 3 \times 19 = 57$$

$$\text{Megan} = 3(19) - 7 = 50$$

$$19 : 57 : 50$$

$$19 : 57 : 50$$

(Total for question 12 is 4 marks)