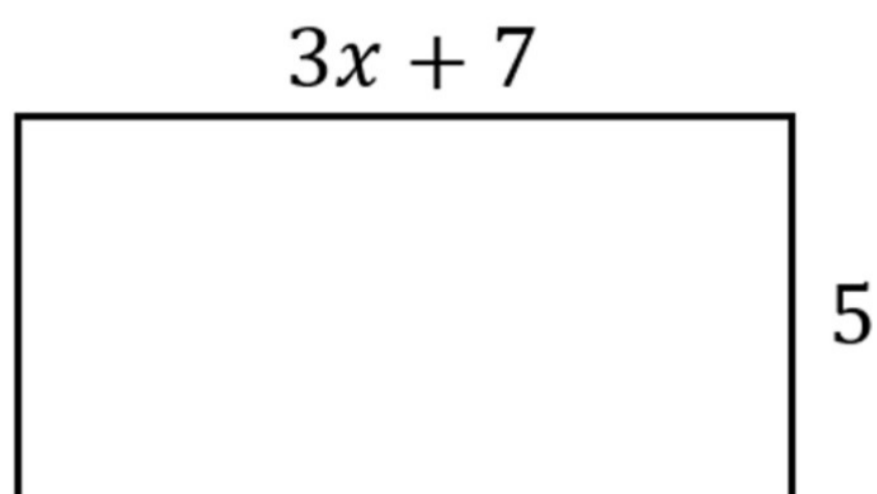


Forming and Solving Equations Exam Practice



- Q1. a) Find an expression for the perimeter of the shape below, in terms of x , simplifying your answer fully.



$$\begin{aligned} & 3x + 7 + 3x + 7 + 5 + 5 \\ = & 6x + 24 \end{aligned}$$

Answer: $6x + 24$
(2 marks)

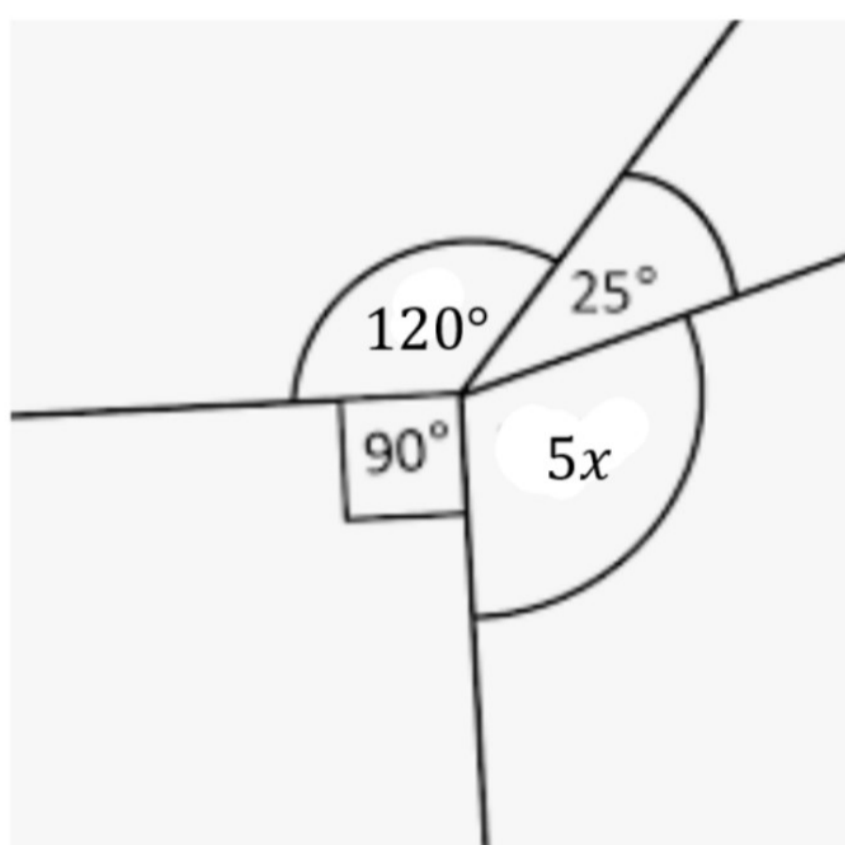
- b) Given that the perimeter of the shape is 78 cm, find x .

$$\begin{aligned} 6x + 24 &= 78 \\ 6x &= 54 \\ x &= 9 \end{aligned}$$

Answer: 9
(2 marks)



Q2. By forming and solving a suitable equation, find the value of x .



$$5x + 90 + 120 + 25 = 360$$

$$5x + 235 = 360$$

$$5x = 125$$

$$x = 25$$

Answer: 25
(3 marks)



Q3. Jim buys p folders, Bill buys twice as many folders as Jim, and Peter buys 4 more folders than Bill.

a) Work out an expression for how many folders they have bought altogether.

$$p + 2p + 2p + 4$$
$$= 5p + 4$$

Answer: $5p + 4$
(2 marks)

b) You are given that they buy a total of 34 folders. Work out how many folders they bought each.

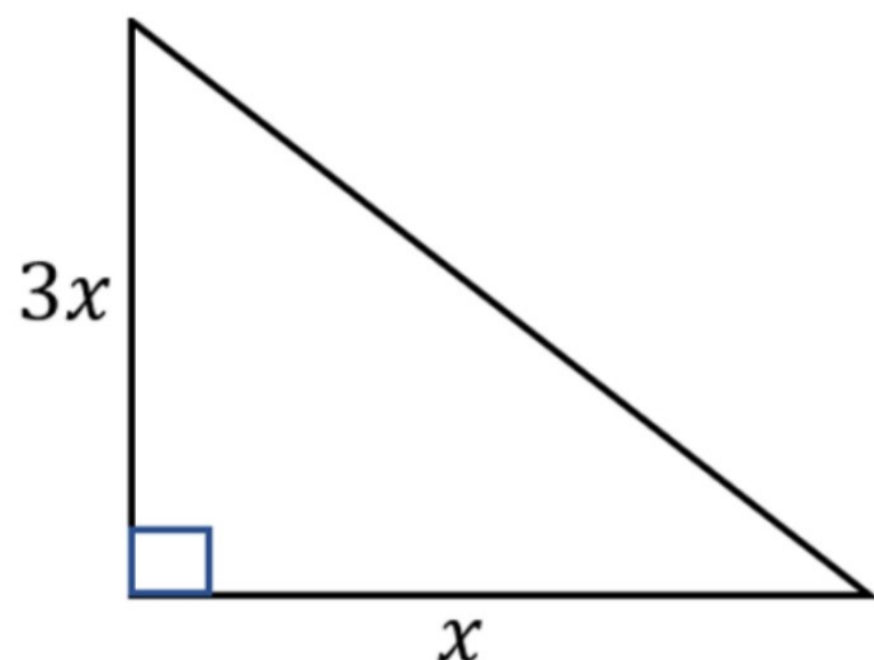
$$5p + 4 = 34$$
$$5p = 30$$
$$p = 6$$

Jim: 6, Bill: 12, Peter: 16

Answer: J: 6, B: 12, P: 16
(2 marks)



Q4. The area of the right-angled triangle below is 294 cm^2 . Find the lengths of the two perpendicular sides.



$$\frac{1}{2} \times x \times 3x = 294$$

$$3x^2 = 588$$

$$x^2 = 196$$

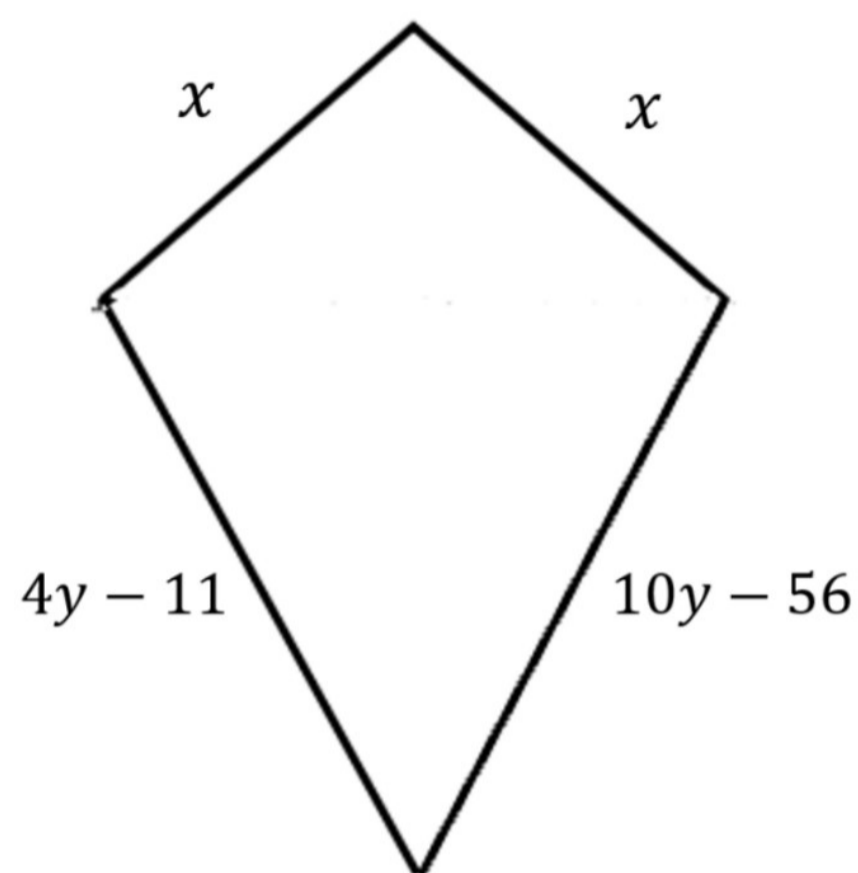
$$x = 14$$

$$\Rightarrow \text{lengths are } 14, 42$$

Answer: 14, 42
(3 marks)



Q5. The diagram below shows a kite. The perimeter of the kite is 92 cm.
Find the value of x and y .



$$4y - 11 = 10y - 56$$
$$45 = 6y$$

$$\bullet \quad 4y - 11 = 10y - 56$$
$$\Rightarrow 45 = 6y$$
$$\Rightarrow y = 7.5$$

$$\bullet \quad (4(7.5) - 11) \times 2 + 2x = 92$$
$$\Rightarrow 38 + 2x = 92$$
$$\Rightarrow x = 27$$

Answer: $x = 27, y = 7$
(4 marks)

Q6. In 5 years' time, Tony will three times as old as he was 3 years ago.
Express this information as an equation and hence work how old he is now.

\bullet Let $x =$ Tony's age now

$$x + 5 = 3(x - 3)$$

$$x + 5 = 3x - 9$$

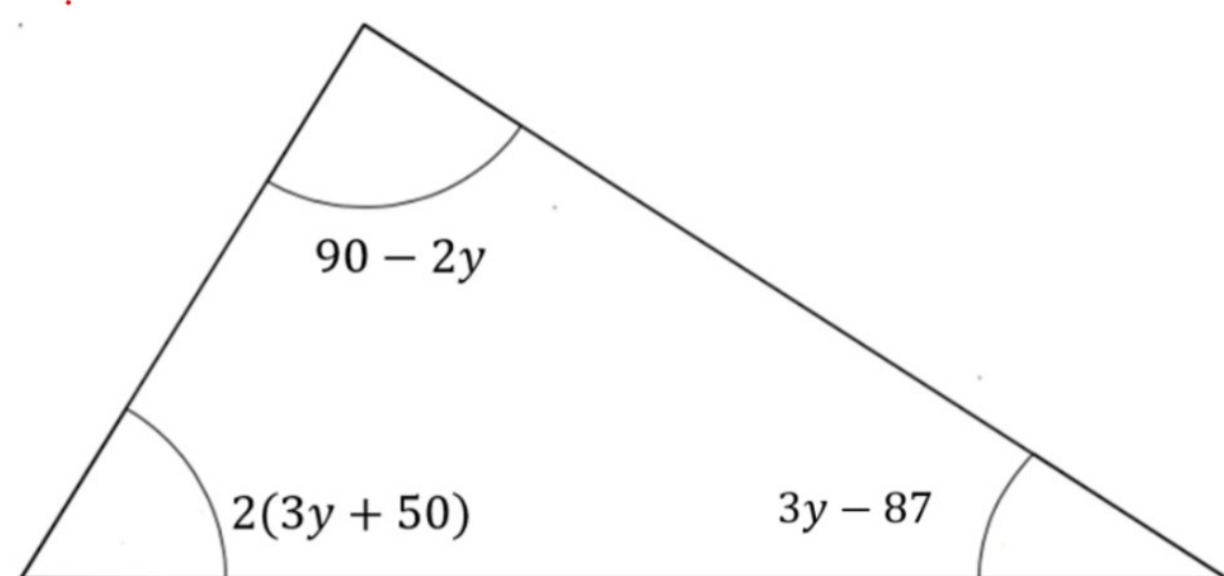
$$14 = 2x$$

$$x = 7$$

Answer: 7
(3 marks)



Q7. In the diagram below, all the angles are marked in degrees. Find the value of y and hence show why this cannot represent an actual triangle.



$$\bullet \quad 2(3y + 50) + 90 - 2y + 3y - 87 = 180$$

$$6y + 100 + 90 - 2y + 3y - 87 = 180$$

$$7y = 77$$

$$\Rightarrow y = 11$$

$$\bullet \quad \text{Angle } 90 - 2y \text{ is } 90 - 2(11) = 78$$

$$\text{Angle } 2(3y + 50) \text{ is } 166$$

$$\text{Angle } 3y - 87 \text{ is } -54, \text{ which is impossible.}$$

• So this cannot represent an actual triangle.

Answer: Angle $3y - 87$ is negative

(4 marks)



Q8. Jo buys x cans of paint at the warehouse. Each one costs 80p and he will sell them for £4.30 each in his shop. The running costs of the shop each day are £25.

(i) Let P be Jo's daily profit in pounds. Find an equation for P in terms of x .

- profit per can is: $4.30 - 0.80 = 3.50$
- $P = 3.50x - 25$

Answer: $P = 3.50x - 25$
(2 marks)

(ii) Find the number of cans he needs to make a profit of £115.

$$\begin{aligned}3.50x - 25 &= 115 \\3.50x &= 140 \\x &= \underline{40} \text{ cans}\end{aligned}$$

Answer: 40 cans
(2 marks)



Q9. The ratio of the perimeter of a square to the perimeter of an equilateral triangle is 1 : 2. If the square has side length $2x - 5$ and the triangle has side length 16, find the perimeter of the square.

- perimeter of square is $4(2x - 5) = 8x - 20$
- perimeter of triangle is $3 \times 16 = 48$

(square) (triangle)

$$2(8x - 20) = 48$$

$$16x - 40 = 48$$

$$16x = 88$$

$$x = 5.5$$

Answer: $x = 5.5$
(4 marks)