

Sample pages – Demonstrate Mathematical Reasonings. Basic Skills (p. 5 and p. 44)

A1. Example. The perimeter of the rectangle below is 22 cm. Find the value of x and each side length.



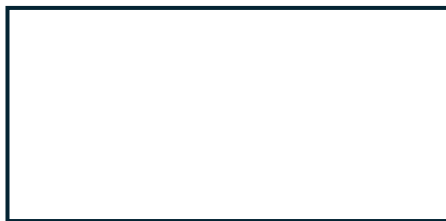
$$3x + 1$$

$$2x - 5$$

Solution

- a) $3x + 1 + 2x - 5 + 3x + 1 + 2x - 5 = 22$
- b) $10x - 8 = 22$
- c) $10x = 22 + 8$
- d) $10x = 30$
- e) $x = 3$
- f) Length = $3x + 1 = 3 \times 3 + 1 = 10$
- g) Width = $2x - 5 = 2 \times 3 - 5 = 1$

A1.1 The perimeter of the rectangle below is 64 cm. Find the value of x and each side length.



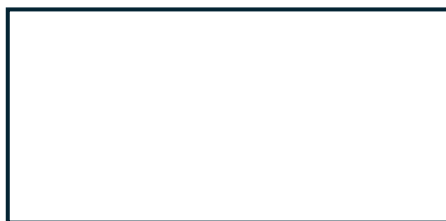
$$4x + 5$$

$$2x - 3$$

Solution

- a)
- b)
- c)
- d)
- e)
- f)
- g)

A1.2 The perimeter of the rectangle below is 120 cm. Find the value of x and each side length.



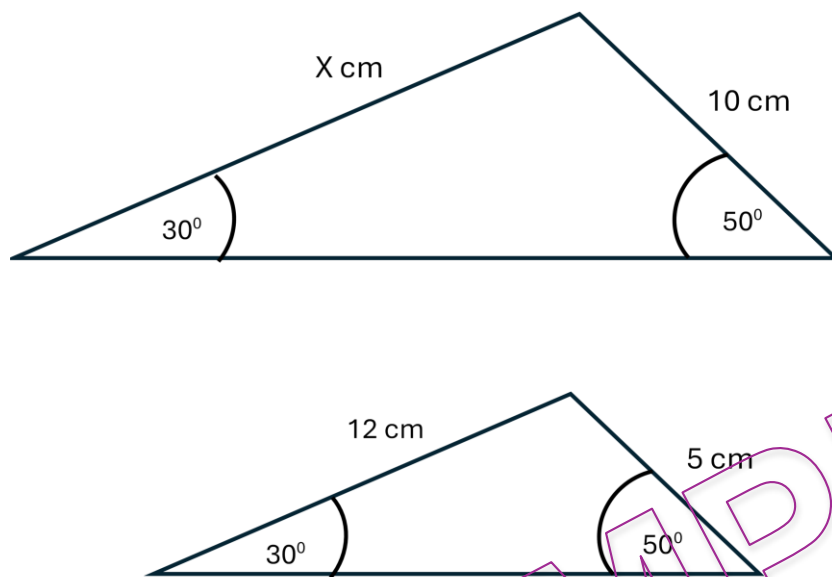
$$7x + 1$$

$$x - 5$$

Solution

- a)
- b)
- c)
- d)
- e)
- f)
- g)

A17 Example. Calculate the unknown lengths for the similar triangles below. First, you need to justify that triangles are similar.



Solution

- Justification: Two angles in each triangle are equal
- Calculate a scale factor (SF) using given side lengths:

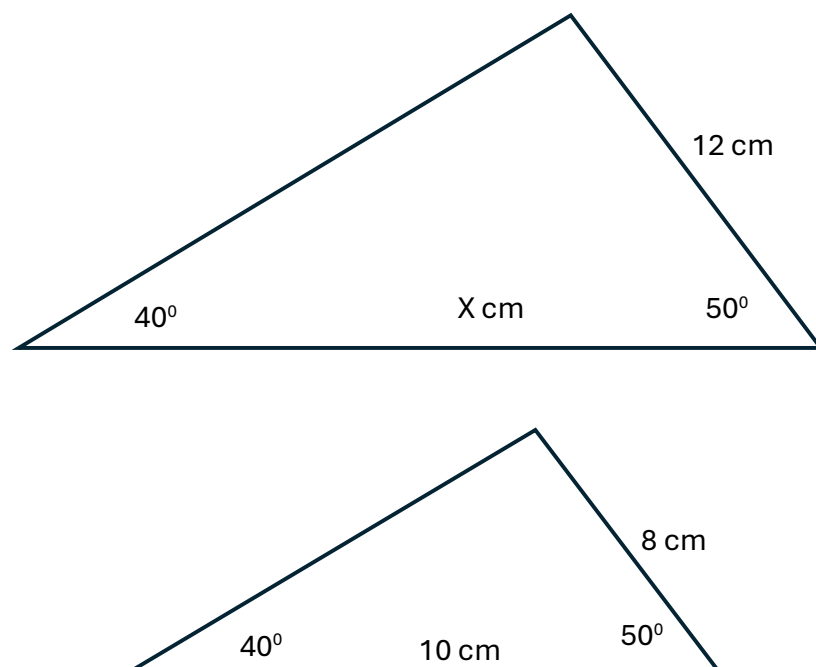
$$SF = \frac{10}{5} = 2$$

- Calculate the same scale factor using two other lengths:

$$SF = \frac{x}{12} = 2$$

- Solve the equation above to get x = 24 cm.

A17.1 Calculate the unknown lengths for the similar triangles below. First, you need to justify that triangles are similar.



Solution

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-
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Step-by-step Solutions (p. 5 and p. 44)

A1. Example. The perimeter of the rectangle below is 22 cm. Find the value of x and each side length.



$$3x + 1$$

$$2x - 5$$

Solution

$$\text{h) } 3x + 1 + 2x - 5 + 3x + 1 + 2x - 5 = 22$$

$$\text{i) } 10x - 8 = 22$$

$$\text{j) } 10x = 22 + 8$$

$$\text{k) } 10x = 30$$

$$\text{l) } x = 3$$

$$\text{m) Length} = 3x + 1 = 3 \times 3 + 1 = 10$$

$$\text{n) Width} = 2x - 5 = 2 \times 3 - 5 = 1$$

A1.1 The perimeter of the rectangle below is 64 cm. Find the value of x and each side length.



$$4x + 5$$

$$2x - 3$$

Solution

$$\text{h) } 4x + 5 + 2x - 3 + 4x + 5 + 2x - 3 = 64$$

$$\text{i) } 12x + 4 = 64$$

$$\text{j) } 12x = 64 - 4$$

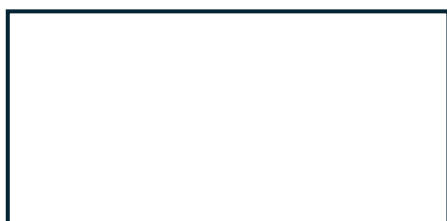
$$\text{k) } 12x = 60$$

$$\text{l) } x = 5$$

$$\text{m) Length} = 4x + 5 = 4 \times 5 + 5 = 25$$

$$\text{n) Width} = 2x - 3 = 2 \times 5 - 3 = 7$$

A1.2 The perimeter of the rectangle below is 120 cm. Find the value of x and each side length.



$$7x + 1$$

$$x - 5$$

Solution

$$\text{h) } 7x + 1 + x - 5 + 7x + 1 + x - 5 = 120$$

$$\text{i) } 16x - 8 = 120$$

$$\text{j) } 16x = 120 + 8$$

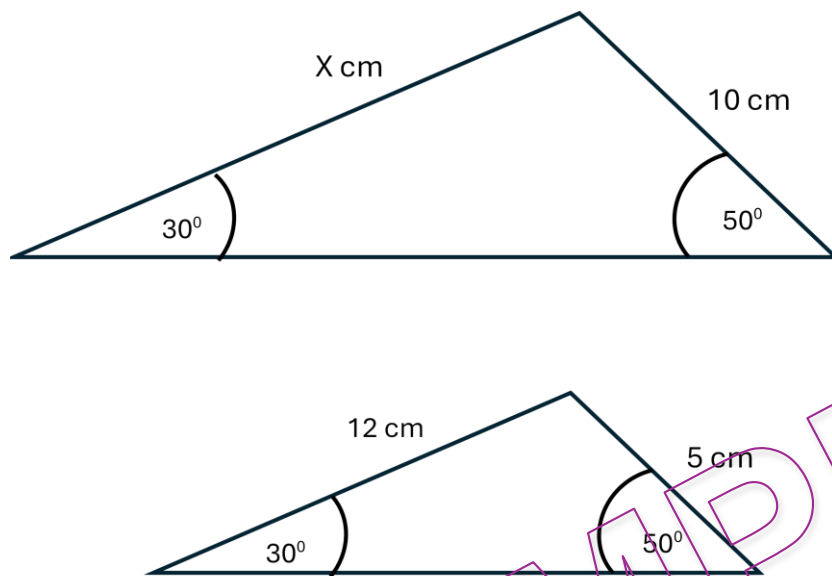
$$\text{k) } 16x = 128$$

$$\text{l) } x = \frac{128}{16} = 8$$

$$\text{m) Length} = 7x + 1 = 7 \times 8 + 1 = 57$$

$$\text{n) Width} = x - 5 = 8 - 5 = 3$$

A17 Example. Calculate the unknown lengths for the similar triangles below. First, you need to justify that triangles are similar.



Solution

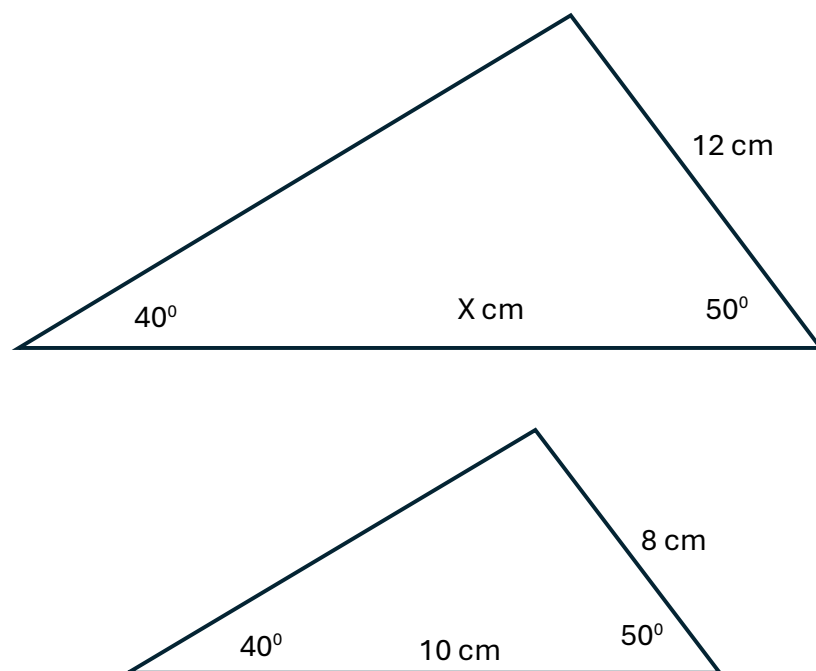
- e) Justification: Two angles in each triangle are equal
- f) Calculate a scale factor (SF) using given side lengths:

$$SF = \frac{10}{5} = 2$$
- g) Calculate the same scale factor using two other lengths:

$$SF = \frac{x}{12} = 2$$
- h) Solve the equation above to get x

$$= 24 \text{ cm.}$$

A17.1 Calculate the unknown lengths for the similar triangles below. First, you need to justify that triangles are similar.



Solution

- e) Justification: Two angles in each triangle are equal
- f) Calculate a scale factor (SF) using given side lengths:

$$SF = \frac{12}{8} = 1.5$$
- g) Calculate the same scale factor using two other lengths:

$$SF = \frac{x}{10} = 1.5$$
- h) Solve the equation above

$$x = 15 \text{ cm.}$$