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Geometry

The perimeter of a triangle

The perimeter is the sum of the sides: p = a + b + c. For an isosceles triangle p = b + 2l, for an equilateral one p = 3l. And before adding, all sides in the same unit!

In this video we see the method with an animation and solve 3 exercises step by step: different units, triangles with the same perimeter and a real-life problem.

The method

$$p = a + b + c$$

$$p_{\text{isosceles}} = b + 2\,l$$

$$p_{\text{equilateral}} = 3\,l$$

Worked examples

Exercise 1

The sides of a triangle are 0.7 dm, 5.6 cm and 83 mm. What is the perimeter in centimetres?

Data: $a = 0.7\ \text{dm} \cdot b = 5.6\ \text{cm} \cdot c = 83\ \text{mm}$

1. **First, all sides in centimetres**

$$0.7\ \text{dm} = 0.7 \times 10 = 7\ \text{cm}$$

$$83\ \text{mm} = 83 : 10 = 8.3\ \text{cm}$$

💡 dm → cm: multiply by 10. mm → cm: divide by 10

Result: $a = 7\ \text{cm} \quad c = 8.3\ \text{cm}$

2. **Perimeter = sum of the three sides**

$$p = 7 + 5.6 + 8.3 = 20.9 \text{ cm}$$

Result: $p = 20.9 \text{ cm}$

✓ Check

$$70 + 56 + 83 = 209 \text{ mm}$$

$$209 \text{ mm} = 20.9 \text{ cm} \checkmark$$

Exercise 2

An isosceles triangle has the same perimeter as an equilateral triangle with 35 cm sides. Its base is 28 cm. How long is each leg?

Data: $l_{\text{eq}} = 35 \text{ cm} \cdot b = 28 \text{ cm} \cdot p_{\text{is}} = p_{\text{eq}}$

1. **Perimeter of the equilateral triangle: three equal sides**

$$p = 3 \times 35 = 105 \text{ cm}$$

Result: $p = 105 \text{ cm}$

2. **"Same perimeter": the isosceles triangle also has p = 105 cm**

$$2\,l = p - b = 105 - 28 = 77 \text{ cm}$$

3. **The two legs are equal: we divide by 2**

$$l = 77 : 2 = 38.5 \text{ cm}$$

Result: $l = 38.5 \text{ cm}$

✓ Check

$$28 + 38.5 + 38.5 = 105 \text{ cm} \checkmark$$

Exercise 3

A triangular flower bed has two sides of 9 m and 16 m. Fencing it with a hedge at 13 euros per metre costs 468 euros. How long is the third side?

Data: $a = 9\ \text{m} \cdot b = 16\ \text{m} \cdot 468\ \text{euros} \cdot 13\ \text{euros/m}$

1. **How many metres of hedge? Cost : price per metre**

$$p = 468 : 13 = 36\ \text{m}$$

> 💡 The hedge goes all around the bed: its length is the perimeter!

Result: $p = 36\ \text{m}$

2. **Third side = perimeter − known sides**

$$c = 36 - 9 - 16 = 11\ \text{m}$$

Result: $c = 11\ \text{m}$

✓ Check

$$9 + 16 + 11 = 36\ \text{m}$$

$$36 \times 13 = 468\ \text{euros}\ \checkmark$$

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