

Algebra with geometry – Solutions

Worked answers showing the equation and solution for each problem.



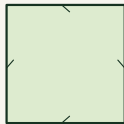
Name _____

Date _____

Solution method

Identify the geometry fact from the labelled diagram, write it as an equation, solve for x , and check the answer is sensible (a positive length, or an angle between 0° and 360°).

Worked example A square has side x cm. Its perimeter is 40 cm. Find x .

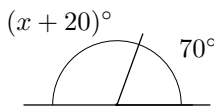


x cm

$$4x = 40$$

$$x = 10$$

1. Angles on a straight line are $(x + 20)^\circ$ and 70° . Find x .



Solution

$$(x + 20) + 70 = 180 \quad x = 90$$

2. A right angle is split into x° and 35° . Find x .

Solution

$$x + 35 = 90 \quad x = 55$$

3. A square has side x cm and perimeter 28 cm. Find x .

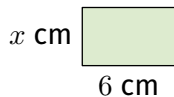


x cm

Solution

$$4x = 28 \quad x = 7$$

4. A rectangle has length 6 cm and width x cm. Its perimeter is 22 cm. Find x .

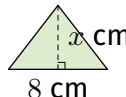


6 cm

Solution

$$2(6 + x) = 22 \quad x = 5$$

5. A triangle has base 8 cm and height x cm. Its area is 20 cm^2 . Find x .

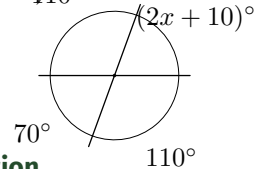


8 cm

Solution

$$\frac{1}{2}(8)(x) = 20 \quad x = 5$$

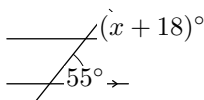
6. Vertically opposite angles are $(2x + 10)^\circ$ and 70° . Find x .



Solution

$$2x + 10 = 70 \quad x = 30$$

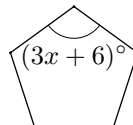
7. Corresponding angles are $(x + 18)^\circ$ and 55° . Find x .



Solution

$$x + 18 = 55 \quad x = 37$$

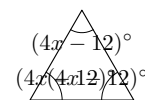
8. A regular pentagon has interior angle 108° . If an angle is labelled $(3x + 6)^\circ$, find x .



Solution

$$3x + 6 = 108 \quad x = 34$$

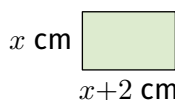
9. An equilateral triangle has each angle $(4x - 12)^\circ$. Find x .



Solution

$$4x - 12 = 60 \quad x = 18$$

10. A rectangle has width x cm and length $(x + 2)$ cm. If the perimeter is 18 cm, find x .

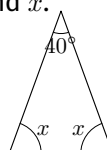


$x + 2$ cm

Solution

$$2(2x + 2) = 18 \quad x = 3.5$$

11. A triangle has angles x° , x° , and 40° . Find x .



Solution

$$2x + 40 = 180 \quad x = 70$$

12. A supplementary angle pair is $(5x)^\circ$ and 80° . Find x .

Solution

$$5x + 80 = 180 \quad x = 20$$

Algebra with geometry – Solutions

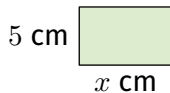
More practice: perimeter, area, angle, and polygon facts written as equations.



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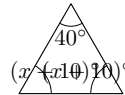
- 13.** A rectangle has area 30 cm^2 , width 5 cm , and length $x \text{ cm}$. Find x .



Solution

$$5x = 30 \quad x = 6$$

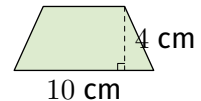
- 14.** An isosceles triangle has equal angles $(x + 10)^\circ$ and apex angle 40° . Find x .



Solution

$$2(x + 10) + 40 = 180 \quad x = 60$$

- 15.** The trapezium has area 28 cm^2 . Find x .



Solution

$$\frac{1}{2}((x + 2) + 10)4 = 28 \quad 2x + 24 = 28$$

$$x = 2$$

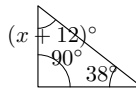
- 16.** A square has side $x \text{ cm}$. Its perimeter is 36 cm . Find x .



Solution

$$4x = 36 \quad x = 9$$

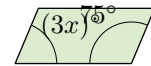
- 17.** A right-angled triangle has one acute angle $(x + 12)^\circ$ and the other 38° . Find x .



Solution

$$(x + 12) + 38 = 90 \quad x = 40$$

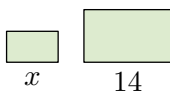
- 18.** A parallelogram has one interior angle $(3x)^\circ$ and the adjacent angle is 75° . Find x .



Solution

$$3x + 75 = 180 \quad x = 35$$

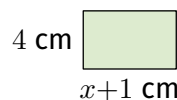
- 19.** A similar shape has scale factor 2. A side grows from $x \text{ cm}$ to 14 cm . Find x .



Solution

$$2x = 14 \quad x = 7$$

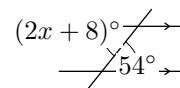
- 20.** A rectangle has length $(x + 1) \text{ cm}$ and width 4 cm . Its area is 24 cm^2 . Find x .



Solution

$$4(x + 1) = 24 \quad x = 5$$

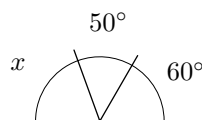
- 21.** Alternate angles are $(2x + 8)^\circ$ and 54° . Find x .



Solution

$$2x + 8 = 54 \quad x = 23$$

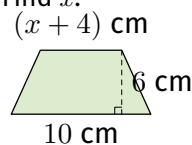
- 22.** Three angles on a straight line are x° , 50° , and 60° . Find x .



Solution

$$x + 50 + 60 = 180 \quad x = 70$$

- 23.** The trapezium has area 48 cm^2 . Find x .



Solution

$$\frac{1}{2}((x + 4) + 10)6 = 48 \quad 3x + 42 = 48$$

$$x = 2$$

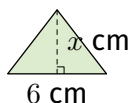
- 24.** A rectangle has perimeter 26 cm . Its length is $x \text{ cm}$ and width is 3 cm . Find x .



Solution

$$2(x + 3) = 26 \quad x = 10$$

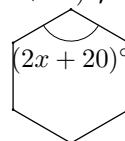
- 25.** A triangle has area 18 cm^2 , base 6 cm , and height $x \text{ cm}$. Find x .



Solution

$$\frac{1}{2}(6)(x) = 18 \quad x = 6$$

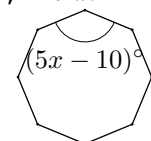
- 26.** A regular hexagon has each interior angle 120° . If an angle is labelled $(2x + 20)^\circ$, find x .



Solution

$$2x + 20 = 120 \quad x = 50$$

- 27.** A regular octagon has interior angle 135° . If an angle is labelled $(5x - 10)^\circ$, find x .



Solution

$$5x - 10 = 135 \quad x = 29$$