

WA7MMGTW6

Two-dimensional space and structures

Core + Challenge

# Angle Sum of a Triangle

I can use the angle sum of a triangle and the exterior angle rule to find unknown angles and explain why the rule works.

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 58

## Key idea

The three angles of any triangle add to **180°**. Unknown angle =  $180^\circ - (\text{the other two})$ .

**Isosceles:** the two angles opposite the equal sides (marked with ticks) are equal. **Equilateral:** every angle is 60°.

**Exterior angle:** extend one side. The exterior angle equals the **sum of the two opposite interior angles**.

Set up an equation when angles are given with letters:  $x + 2x + 3x = 180^\circ \rightarrow x = 30^\circ$ .

A

**Fluency** *practise the skill*

/ 16 marks

Work out each answer. 1 mark each.

1. Third angle: 50°, 60° \_\_\_\_\_

9. Each angle in an equilateral triangle \_\_\_\_\_

2. Third angle: 90°, 35° \_\_\_\_\_

10. Isosceles, apex 40°: each base angle \_\_\_\_\_

3. Third angle: 45°, 45° \_\_\_\_\_

11. Isosceles, base angles 65°: apex \_\_\_\_\_

4. Third angle: 120°, 25° \_\_\_\_\_

12. Right-angled isosceles: other angles \_\_\_\_\_

5. Third angle: 33°, 77° \_\_\_\_\_

13. Exterior angle; opposite angles 40°, 65° \_\_\_\_\_

6. Third angle: 100°, 40° \_\_\_\_\_

14. Exterior 130°; one opposite 70°: other \_\_\_\_\_

7. Third angle: 62°, 58° \_\_\_\_\_

15. Third angle: 28.5°, 91.5° \_\_\_\_\_

8. Third angle: 17°, 90° \_\_\_\_\_

16. Angles x, x, 100°: find x \_\_\_\_\_

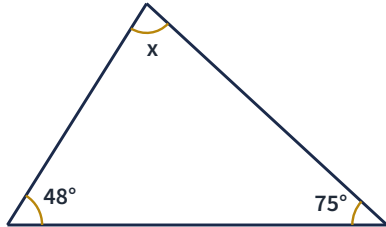
## Angle Sum of a Triangle · WA7MMGTW6

**B****Core** *apply the skill to problems*

/ 22 marks

**1** Find  $x$ .

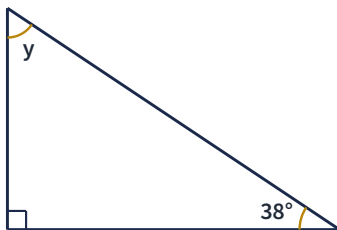
[2 marks]



Answer: \_\_\_\_\_

**2** Find  $y$ .

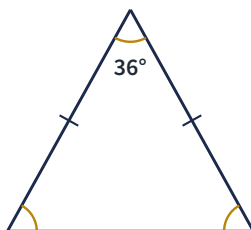
[2 marks]



Answer: \_\_\_\_\_

**3** This triangle is isosceles. Find each base angle.

[2 marks]

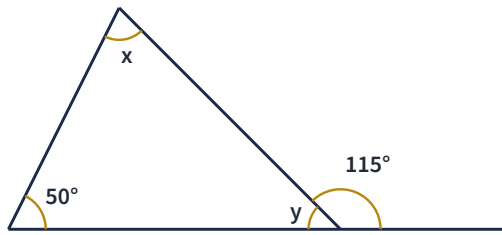


Answer: \_\_\_\_\_

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- 4 Find  $x$  and  $y$ . Give reasons.

[3 marks]



Answer: \_\_\_\_\_

- 5 The angles of a triangle are  $x$ ,  $2x$  and  $3x$ . Find each angle.

[2 marks]

.....

.....

Answer: \_\_\_\_\_

- 6 A roof truss is an isosceles triangle. Each base angle (the roof pitch) is  $25^\circ$ . Find the angle at the top.

[2 marks]

.....

Answer: \_\_\_\_\_

- 7 Can a triangle have angles of  $95^\circ$  and  $90^\circ$ ? Explain.

[2 marks]

.....

Answer: \_\_\_\_\_

- 8 The angles of a triangle are  $(x + 10)^\circ$ ,  $(x + 20)^\circ$  and  $(x + 30)^\circ$ . Find  $x$  and the three angles.

[3 marks]

.....

.....

Answer: \_\_\_\_\_

- 9 A set square has a right angle and a  $30^\circ$  angle. Find its third angle.

[2 marks]

.....

Answer: \_\_\_\_\_

## Angle Sum of a Triangle · WA7MMGTW6

- 10 One side of an equilateral triangle is extended. Find the exterior angle.

[2 marks]

.....

Answer: .....

**C Reasoning** *explain, justify and check*

/ 9 marks

- 1 Explain why the angles of a triangle add to  $180^\circ$ . You could tear off the corners, or use a parallel line.

[3 marks]

.....  
.....  
.....

- 2 Explain why a triangle cannot have two right angles.

[2 marks]

.....  
.....

- 3 Explain why each angle of an equilateral triangle is  $60^\circ$ .

[2 marks]

.....  
.....

- 4 Use Core Q4 to explain why an exterior angle equals the sum of the two opposite interior angles.

[2 marks]

.....  
.....

**D****Challenge** *multi-step and problem-solving*

/ 11 marks

- 1 An isosceles triangle has one angle of  $50^\circ$ . Find the two possible sets of angles. [3 marks]

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.....

Answer: \_\_\_\_\_

- 2 Split a quadrilateral into two triangles to show its angles add to  $360^\circ$ . Then find the fourth angle when the others are  $110^\circ$ ,  $95^\circ$  and  $80^\circ$ . [3 marks]

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Answer: \_\_\_\_\_

- 3 In a right-angled triangle, one acute angle is 4 times the other. Find both acute angles. [2 marks]

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Answer: \_\_\_\_\_

- 4 In triangle ABC, angle B =  $40^\circ$  and the exterior angle at C is 3 times angle A. Find angle A and angle ACB. [3 marks]

.....

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Answer: \_\_\_\_\_

**How did I go?**

Fluency \_\_\_\_ / 16   Core \_\_\_\_ / 22   Reasoning \_\_\_\_ / 9   Challenge \_\_\_\_ / 11   **Total** \_\_\_\_ / 58

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