

# Angle Facts

## Solutions

For AQA GCSE Mathematics (8300) • Foundation tier

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Each question is shown in grey, followed by the working, one step per line. The final answer is in a box. *Marks* shows how the marks are usually given in the exam, and **Tip** points out a common mistake.

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**1** (1 mark)

An angle is  $124^\circ$

Circle the type of angle.

Options: acute, right angle, obtuse, reflex

$124^\circ$  is more than  $90^\circ$  but less than  $180^\circ$ .

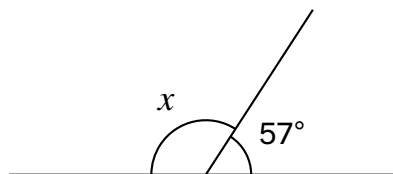
Angles between  $90^\circ$  and  $180^\circ$  are obtuse.

**Answer:** obtuse

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**2** (1 mark)

The diagram shows a straight line.



*Not drawn accurately*

Work out the size of angle  $x$ .

Angles on a straight line add up to  $180^\circ$ .

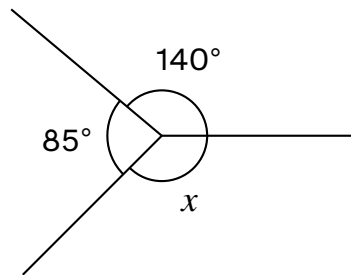
$$x = 180 - 57 = 123^\circ$$

**Answer:**  $123^\circ$

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**3** (2 marks)

Three angles meet at a point.



*Not drawn accurately*

Work out the size of angle  $x$ .

Angles around a point add up to  $360^\circ$ .

Add the angles you know:  $140 + 85 = 225$

$$x = 360 - 225 = 135^\circ$$

**Answer:**  $135^\circ$

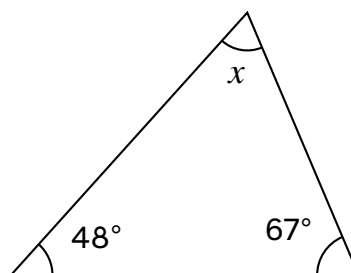
**Tip:** Angles around a point add up to  $360^\circ$ , not  $180^\circ$ . Using  $180$  here is a common mistake.

*Marks:* 1 mark for  $360 - 140 - 85$ . 1 mark for  $135$ .

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**4** (2 marks)

Here is a triangle.



*Not drawn accurately*

Work out the size of angle  $x$ .

Angles in a triangle add up to  $180^\circ$ .

$$48 + 67 = 115$$

$$x = 180 - 115 = 65^\circ$$

**Answer:**  $65^\circ$

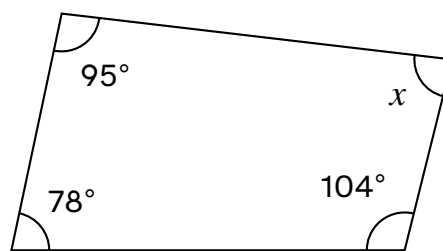
**Tip:** Don't stop after adding  $48 + 67 = 115$ . You still need to subtract from 180.

*Marks:* 1 mark for  $180 - 48 - 67$ . 1 mark for 65.

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**5** (2 marks)

Here is a quadrilateral.



*Not drawn accurately*

Work out the size of angle  $x$ .

Angles in a quadrilateral add up to  $360^\circ$ .

$$78 + 104 + 95 = 277$$

$$x = 360 - 277 = 83^\circ$$

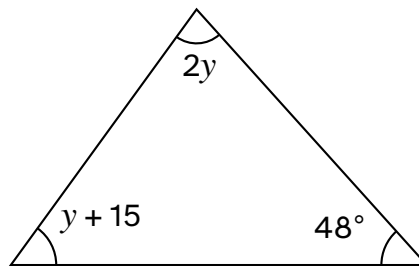
**Answer:**  $83^\circ$

*Marks:* 1 mark for  $360 - 78 - 104 - 95$ . 1 mark for 83.

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**6** (3 marks)

Here is a triangle.



*Not drawn accurately*

Work out the value of  $y$ .

Angles in a triangle add up to  $180^\circ$ .

$$2y + (y + 15) + 48 = 180$$

Collect like terms:  $3y + 63 = 180$

Subtract 63 from both sides:  $3y = 117$

Divide both sides by 3:  $y = 39$

Check:  $2 \times 39 = 78$ ,  $39 + 15 = 54$ , and  $78 + 54 + 48 = 180$  ✓

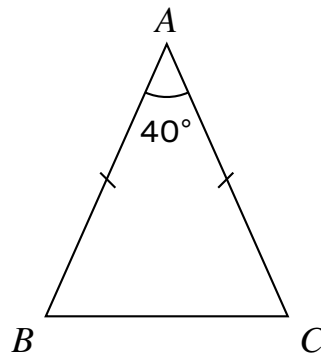
**Answer:**  $y = 39$

**Tip:** Remember to include the +15 when you collect terms:  $2y + y + 15 + 48$  is  $3y + 63$ .

*Marks:* 1 mark for  $2y + y + 15 + 48 = 180$ . 1 mark for  $3y = 117$ . 1 mark for 39.

**7** (2 marks)

$ABC$  is an isosceles triangle with  $AB = AC$ .



*Not drawn accurately*

Work out the size of angle  $ABC$ .

$AB = AC$ , so the triangle is isosceles.

The two base angles, at  $B$  and  $C$ , are equal.

Angles in a triangle add up to  $180^\circ$ .

The base angles add up to  $180 - 40 = 140^\circ$

Angle  $ABC = 140 \div 2 = 70^\circ$

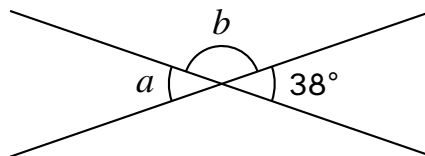
**Answer:**  $70^\circ$

*Marks:* 1 mark for  $(180 - 40) \div 2$ . 1 mark for 70.

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**8** (3 marks)

Two straight lines cross.



*Not drawn accurately*

- (a) Write down the size of angle  $a$ .  
Give a reason for your answer.

Angle  $a$  is opposite the  $38^\circ$  angle, where the two lines cross.

Vertically opposite angles are equal.

So  $a = 38^\circ$

**Answer:**  $38^\circ$ , vertically opposite angles are equal

**Tip:** Write the reason in full: “vertically opposite angles are equal”. Just “opposite” is not enough.

*Marks:* 1 mark for 38. 1 mark for the reason.

(b) Work out the size of angle  $b$ .

Angle  $b$  and the  $38^\circ$  angle lie next to each other on a straight line.

Angles on a straight line add up to  $180^\circ$ .

$$b = 180 - 38 = 142^\circ$$

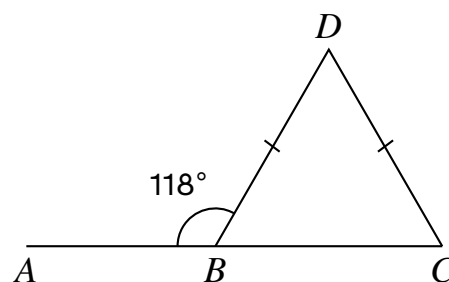
**Answer:**  $142^\circ$

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**9** (3 marks)

$ABC$  is a straight line.

$BD = CD$



*Not drawn accurately*

Work out the size of angle  $BDC$ .

Angle  $DBC$  is next to the  $118^\circ$  angle on the straight line  $ABC$ .

Angles on a straight line add up to  $180^\circ$ .

$$\text{Angle } DBC = 180 - 118 = 62^\circ$$

$BD = CD$ , so triangle  $BCD$  is isosceles.

So angle  $DCB$  is also  $62^\circ$ .

Angles in a triangle add up to  $180^\circ$ .

$$\text{Angle } BDC = 180 - 62 - 62 = 56^\circ$$

**Answer:**  $56^\circ$

**Tip:** Angle  $BDC$  means the angle at  $D$  (the middle letter). Write each angle on the diagram as you find it.

*Marks:* 1 mark for 62. 1 mark for  $180 - 2 \times 62$ . 1 mark for 56.

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**10** (3 marks)

The angles in a triangle are  $x$ ,  $2x$  and  $3x$ .

Work out the size of the largest angle.

Angles in a triangle add up to  $180^\circ$ .

$$x + 2x + 3x = 180$$

$$6x = 180$$

$$x = 180 \div 6 = 30$$

The largest angle is  $3x = 3 \times 30 = 90^\circ$

**Answer:**  $90^\circ$

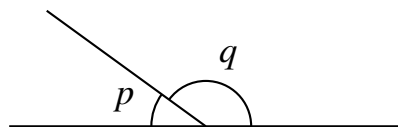
**Tip:** Finding  $x = 30$  is not the end. The question asks for the largest angle, which is  $3x$ .

*Marks:* 1 mark for  $6x = 180$ . 1 mark for  $x = 30$ . 1 mark for 90.

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**11** (2 marks)

$p$  and  $q$  are angles on a straight line.



*Not drawn accurately*

Angle  $q$  is 4 times the size of angle  $p$ .

Show that angle  $p$  is  $36^\circ$

Angles on a straight line add up to  $180^\circ$ .

$$\text{So } p + q = 180$$

$$q = 4p, \text{ so } p + 4p = 180$$

$$5p = 180$$

$$p = 180 \div 5 = 36^\circ$$

**Answer:**  $5p = 180$ , so  $p = 36$

**Tip:** In a “show that” question you must show every step. Checking that  $36 + 4 \times 36 = 180$  only gets full marks if you also state that the angles on a straight line add up to  $180^\circ$ .

*Marks:* 1 mark for  $p + 4p = 180$  or  $180 \div 5$ . 1 mark for 36 with working shown.

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**12** (4 marks)

In an isosceles triangle, the ratio of one base angle to the third angle is 3:4

Work out the size of each base angle and the size of the third angle.

There are **two** base angles, and each one is 3 parts.

So the angles are 3 parts, 3 parts and 4 parts.

$$\text{Total: } 3 + 3 + 4 = 10 \text{ parts}$$

Angles in a triangle add up to  $180^\circ$ .

$$1 \text{ part} = 180 \div 10 = 18^\circ$$

$$\text{Each base angle: } 3 \times 18 = 54^\circ$$

$$\text{Third angle: } 4 \times 18 = 72^\circ$$

Check:  $54 + 54 + 72 = 180$  ✓

**Answer:** Base angles  $54^\circ$  and  $54^\circ$ , third angle  $72^\circ$

**Tip:** Don't share 180 in the ratio 3:4 (7 parts). The ratio is for **one** base angle, and the triangle has two of them.

*Marks:* 1 mark for using  $3 + 3 + 4$  (10 parts). 1 mark for  $180 \div 10$  or 18. 1 mark for 54. 1 mark for 72.

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