

Angles on a line, around a point and vertically opposite

Worked solutions

GCSE Maths topic practice



This topic online

- 1 Write down the mathematical name for an angle that is greater than 90° but less than 180° .

(1 mark)

An angle between 90° and 180° is called an obtuse angle

obtuse

- 2 An angle has size 210° .

Write down the mathematical name for this type of angle.

(1 mark)

An angle greater than 180° but less than 360° is called a reflex angle, and 210° is between 180° and 360°

reflex

- 3 Two angles on a straight line are 47° and p° .

a. Work out the value of p .

b. Write down the mathematical name for an angle of this size.

(2 marks)

a)

$$p = 180 - 47$$

$$p = 133$$

b)

between 90° and 180°

obtuse

- 4 Two angles fit together on a straight line. One of the angles is 64° and the other angle is y° .

a. Work out the value of y .

b. Give a reason for your answer.

(2 marks)

Angles on a straight line add up to 180°

$$y = 180 - 64 = 116$$

- 5 Two straight lines cross at a point. One of the four angles is 52° .
- Write down the size of the angle vertically opposite the 52° angle.
 - Work out the size of one of the other two angles.

(2 marks)

a)

vertically opposite angles are equal

52°

b)

angles on a straight line add to 180°

$$180 - 52 = 128$$

128°

- 6 Three angles meet at a point. Two of the angles are 145° and 118° . The third angle is x° .
Work out the value of x . Give a reason for your answer.

(2 marks)

Angles around a point add up to 360°

$$145 + 118 = 263$$

$$x = 360 - 263 = 97$$

- 7 Jamal says that angles of 130° , 95° and 125° can meet at a point.
Is Jamal correct? You must show your working.

(2 marks)

angles at a point add to 360°

$$130 + 95 + 125 = 350$$

350 is not 360

No, Jamal is wrong

8

In triangle ABC , the point D lies on the side BC , so that BDC is a straight line. Angle $ADB = 112^\circ$ and angle $DAC = 30^\circ$.

- Work out the size of angle ADC . Give a reason for your answer.
- Work out the size of angle ACD . Give a reason for your answer.

(3 marks)

a)

$$AOC = 180 - 112$$

$$AOC = 68^\circ$$

angles on a straight line add to 180°

b)

$$ACD = 180 - 68 - 30$$

$$ACD = 82^\circ$$

angles in a triangle add to 180°

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AOB is a straight line. The point C lies above the line.

Angle $AOC = 5x^\circ$ and angle $COB = (4x - 9)^\circ$.

Work out the value of x . Give a reason for each stage of your working.

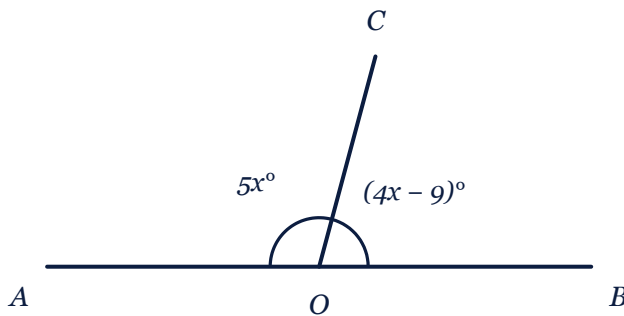


Diagram NOT accurately drawn

(3 marks)

Angles on a straight line add up to 180° , so $5x + 4x - 9 = 180$

$$9x - 9 = 180, \text{ so } 9x = 189$$

$$x = 189 \div 9 = 21$$

Check

$$5 \times 21 = 105 \text{ and } 4 \times 21 - 9 = 75, \text{ and } 105 + 75 = 180$$

$$x = 21$$

10

Two straight lines cross. Two vertically opposite angles are $(3x + 10)^\circ$ and $(5x - 20)^\circ$.

a. Work out the value of x .

b. Work out the size of an angle next to $(3x + 10)^\circ$.

(3 marks)

a)

vertically opposite angles are equal

$$\begin{array}{rclcl}
 3x + 10 & = & 5x - 20 & & \\
 -3x & & & & -3x \\
 10 & = & 2x - 20 & & \\
 +20 & & & & +20 \\
 30 & = & 2x & & \\
 \div 2 & & & & \div 2 \\
 15 & = & x & &
 \end{array}$$

$$x = 15$$

b)

$$3 \times 15 + 10 = 55$$

$$180 - 55 = 125$$

$$125^\circ$$

11

Four angles meet at a point. The angles are $3x^\circ$, $4x^\circ$, $(x + 20)^\circ$ and 100° .

a. Work out the value of x .

b. Give a reason for your method.

(3 marks)

a)

angles at a point add to 360°

$$\begin{array}{rclcl}
 3x + 4x + x + 20 + 100 & = & 360 & & \\
 8x + 120 & = & 360 & & \\
 -120 & & & & -120 \\
 8x & = & 240 & & \\
 \div 8 & & & & \div 8 \\
 x & = & 30 & &
 \end{array}$$

$$x = 30$$

b)

angles around a point add up to 360°