GCSE Maths - Geometry and Measures

Properties of Angles
Worksheet

NOTES

SOLUTIONS

This worksheet will show you how to work out different types of nth term questions. Each section contains a worked example, a question with hints and then questions for you to work through on your own.
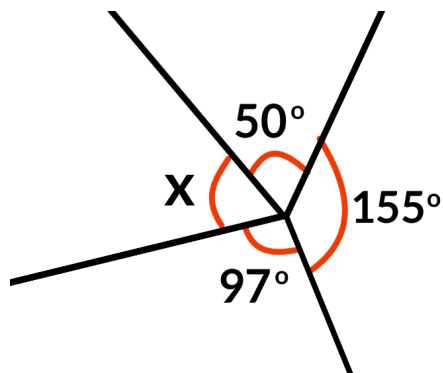
Worked Example

Find the value of angle x in the diagram below:

50°

X

155°

97°

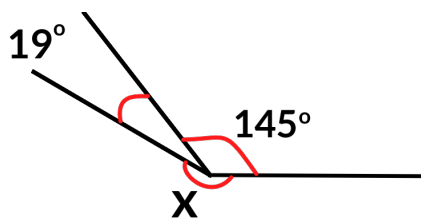**Step 1:** Sum the angles around the point and equate the sum to 360°.

$$x + 50° + 155° + 97° = 360°$$

Step 2: Solve the equation to find x.

$$x = 360° - 50° - 155° - 97°$$

$$x = 58°$$

Guided Example

Find the value of angle x in the diagram below:

19°

145°

X

Step 1: Sum the angles around the point and equate the sum to 360°.

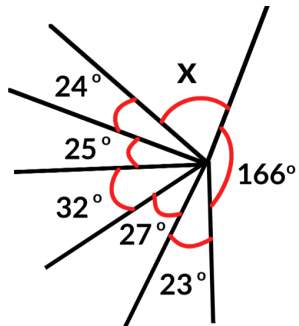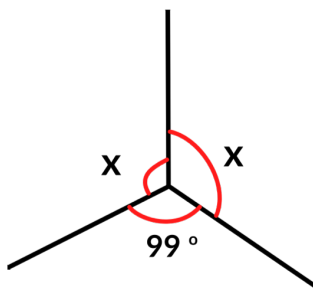**Step 2:** Solve the equation to find x.

1. Find angle x in each of the following diagrams:

a)

b)

c)

d)
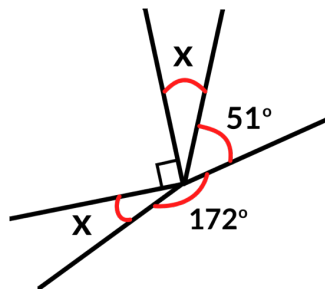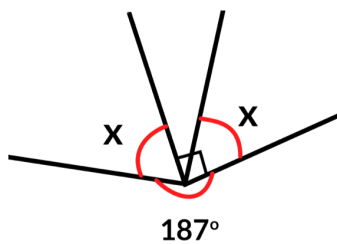
Worked Example

Find the value of angle x in the diagram below:

Step 1: Find relevant angles using alternating and corresponding angles.

$Angle\ CDH =\ Angle\ DEI$ *since they are corresponding angles.*
So,
$$Angle\ CDH = 63°.$$

Step 2: Find angle x.

Here, find x by using the idea that angles on a straight line add up to $180°$*:*

$$x + 63^o = 180^o$$
$$x = 180^o - 63^o = 117^o$$

Guided Example

Find the value of angle x in the diagram below:

Step 1: Find relevant angles using alternating and corresponding angles.

Step 2: Find angle x.

Now it's your turn!

If you get stuck, look back at the worked and guided examples for this section.

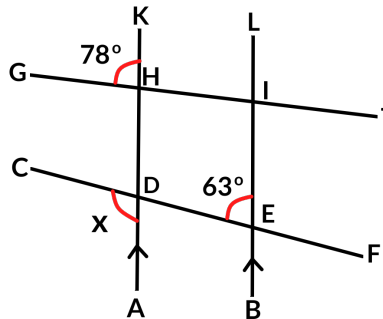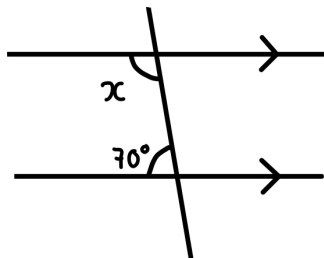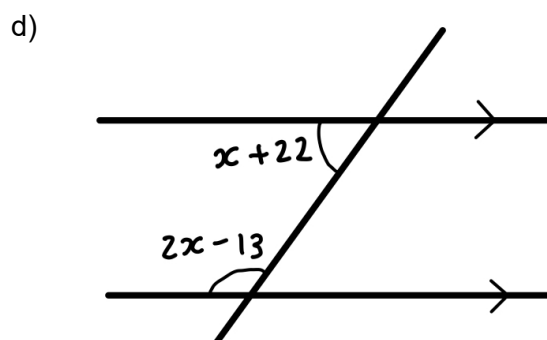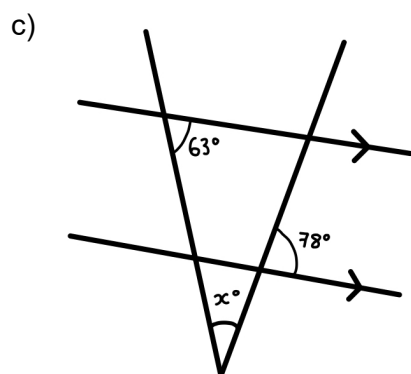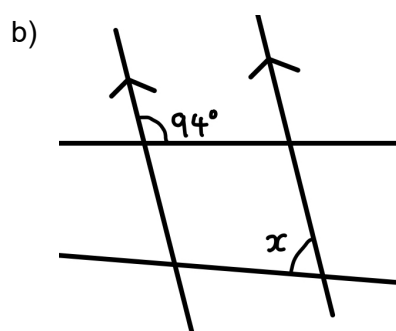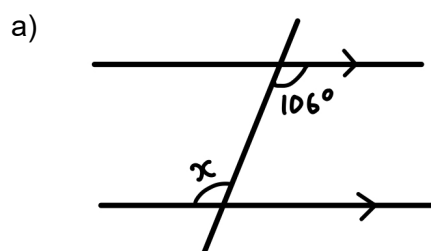2. Find angle x in each of the following diagrams:

a)

b)

c)

d)

Section C

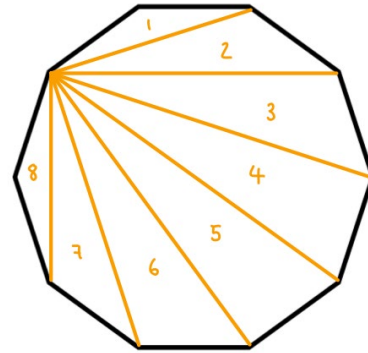<div style="border: 2px solid red">

Worked Example

Calculate the sum of interior angles in a decagon.

Step 1: Count out how many triangles the polygon can be split into.

A decagon is a 10-sided polygon.

As can be seen in the diagram, the decagon can be split into 8 triangles.

Step 2: Multiply the number of triangles by 180° to obtain the sum of the interior angles.

$$8 \times 180° = 1440°$$

</div>

<div style="border: 2px solid orange">

Guided Example

Calculate the sum of interior angles in an octagon.

Step 1: Count out how many triangles the polygon can be split into.

Step 2: Multiply the number of triangles by 180° to obtain the sum of the interior angles.

</div>

Now it's your turn!

If you get stuck, look back at the worked and guided examples for this section.

3. Calculate the sum of the interior angles in a polygon which has 23 sides.

4. Calculate the sum of the interior angles in a polygon which has 14 sides.

5. The sum of the interior angles of a polygon is $12240°$. How many sides does the polygon have?

6. The sum of the interior angles of a polygon is $89640°$. How many sides does the polygon have?
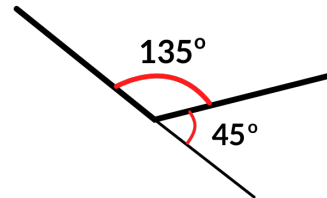
Section D

Worked Example

The diagram shows part of a regular polygon. Calculate how many sides the polygon has.

135°

Step 1: Work out the value of the exterior angle by extending the side of the polygon and using the fact that angles on a line add up to 180°.

$$180^o - 135^o = 45^o$$

135°

45°

Step 2: Use the fact that the exterior angles add up to 360° to find the number of sides, n:

$$45^o \times n = 360^o$$
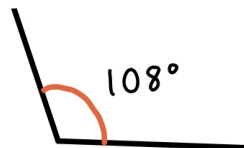$$n = \frac{360°}{45°}$$
$$n = 8$$

So, the polygon has 8 sides and is therefore an octagon.

Guided Example

The diagram shows part of a regular polygon. Calculate how many sides the polygon has.

108°

Step 1: Work out the value of the exterior angle by extending the side of the polygon and using the fact that angles on a line add up to 180°.

Step 2: Use the fact that the exterior angles add up to 360° to find the number of sides, n:

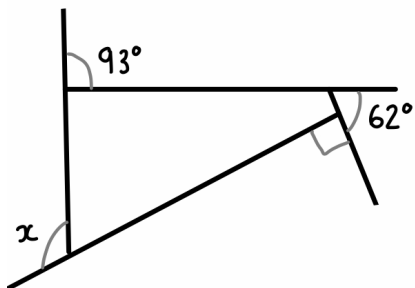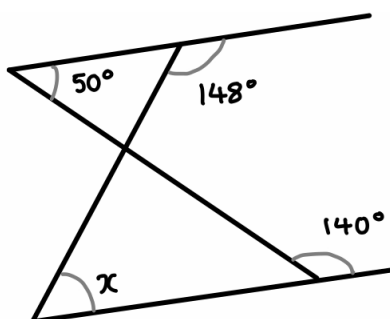7. In the following diagrams, find angle x:

a)

b)
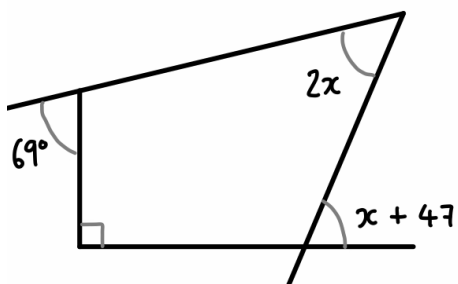
c)

8. The size of each interior angle of a regular polygon is 156°. Work out the number of sides of the polygon.