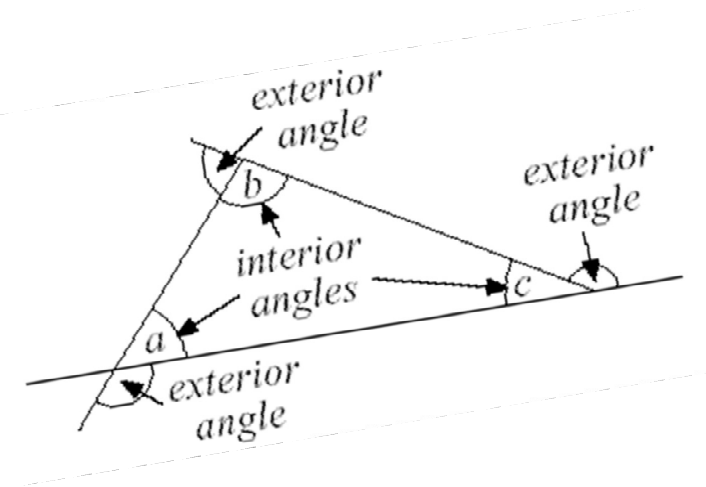
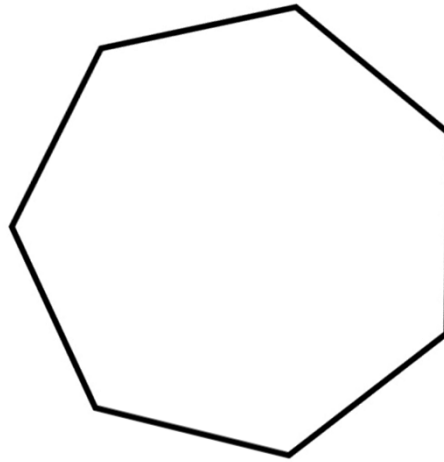
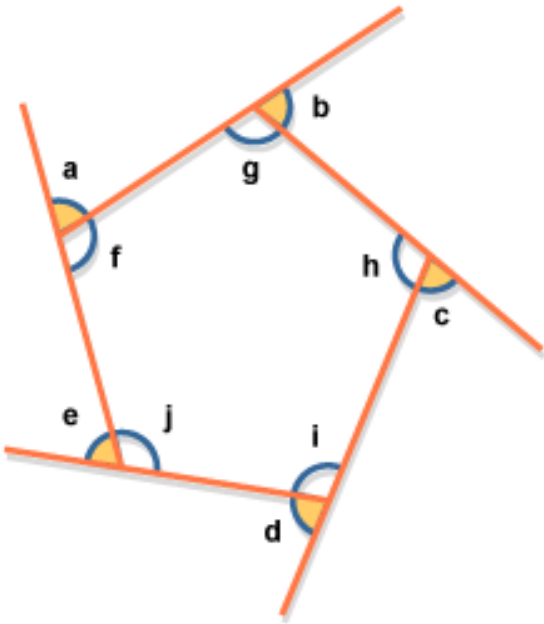


Angles in Polygons



Objectives:

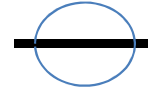
Work out interior and exterior angles of any regular polygon
Solve problems using the properties of shapes

Basic Properties

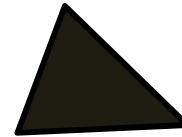
1. Angles on a straight line add up to:



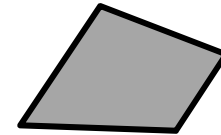
2. Angles around a point add up to:



3. Angles in a triangle add up to:



4. Angles in a quadrilateral add up to:

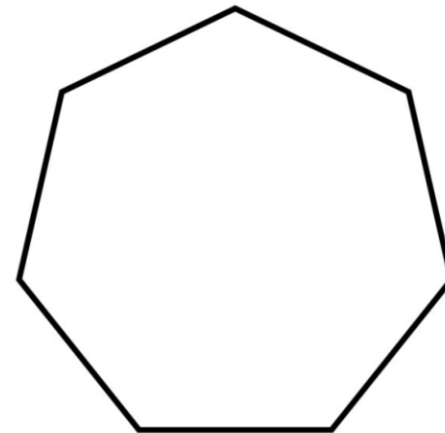


↗
(4 sided shape)

5. Complete the table

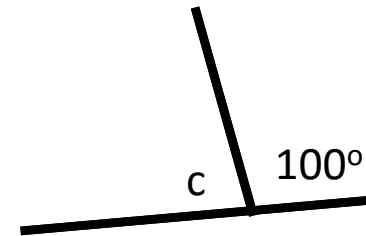
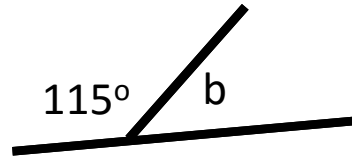
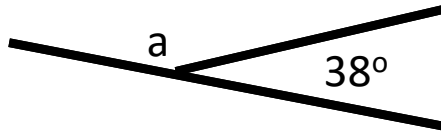
Angle Size	Angle Name
0° to 90°	
90° to 180°	
180° to 360°	
90°	

6. Label the interior angles with 'i'

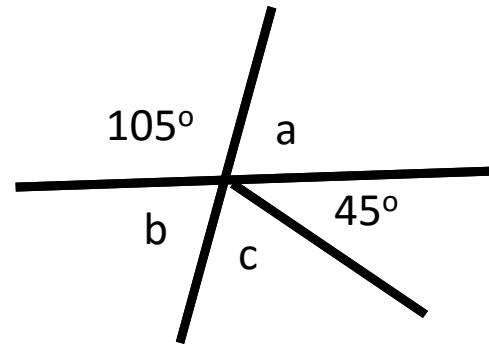
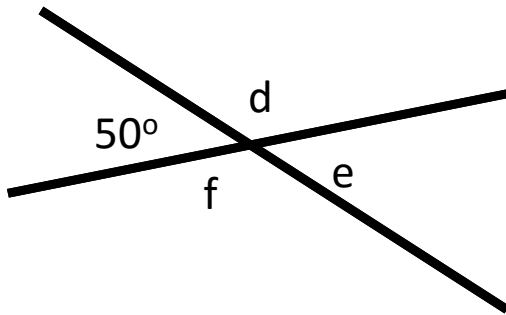


7. Label the exterior angles with 'e'

1. Fill in the missing angles



2. Calculate the size of the missing angles



Exam Tip

It is normally easiest to:

3. Look at the diagram in Q2. When two lines cross, which angles will **always** be equal?

Past Paper

Calculate all the angles in the diagram

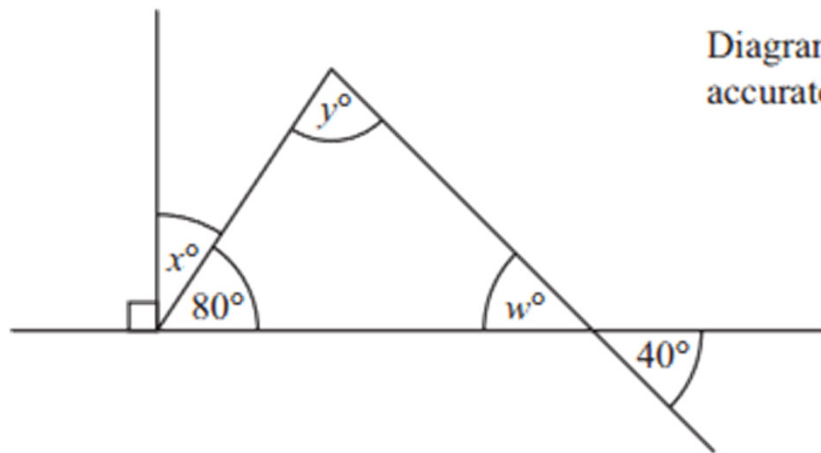
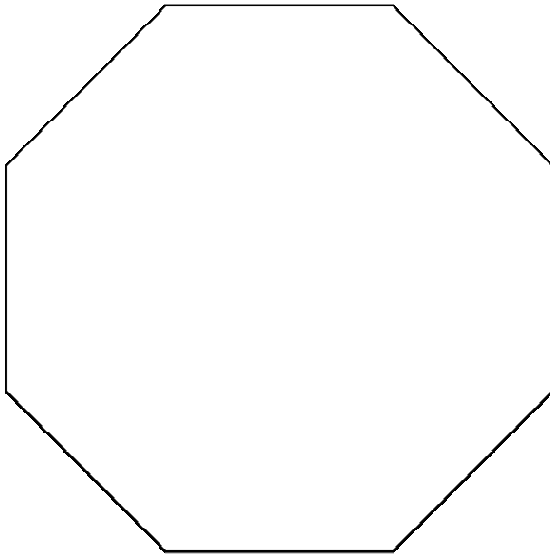


Diagram NOT
accurately drawn

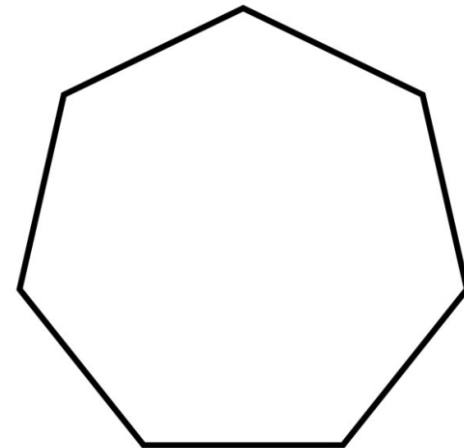
Method 1: Triangles

1. Pick **one vertex** (corner) on the polygon
2. Draw a line to all other vertices- this will split the shape into triangles
3. Shade in all the angles of your triangles



What is the total of all the angles?

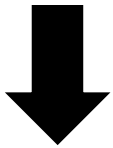
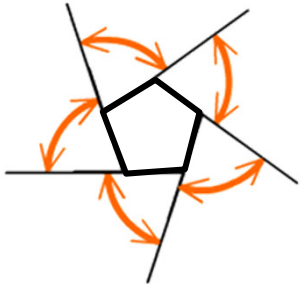
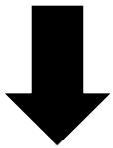
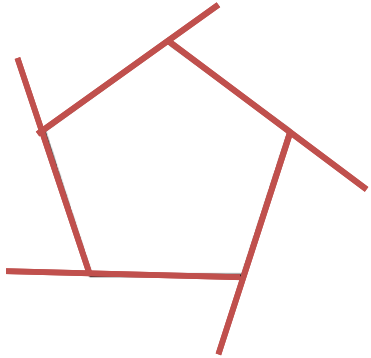
What will each interior angle of the shape be?



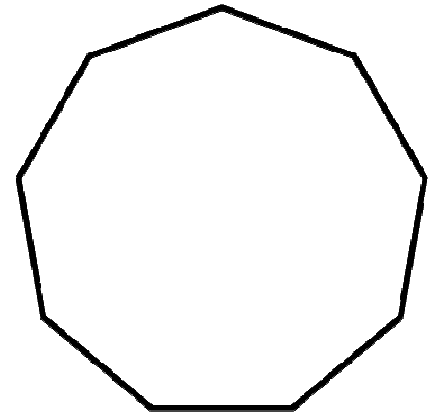
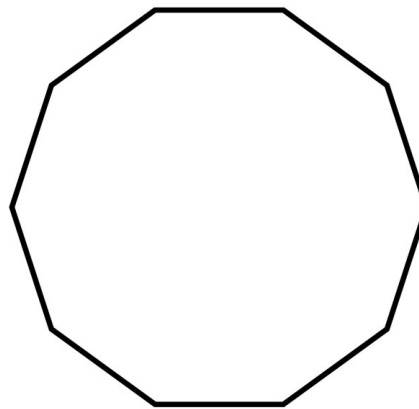
Extension: Can you make a formula that links the number of sides (n) to the total of interior angles

Method 2: Using Exterior Angles

Notes



1. Divide 360° by the number of sides
(this gives the exterior angle)
2. Subtract your answer from 180°
(this gives the interior angle)



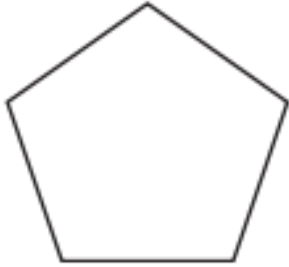
Exterior angles =

Interior angles =

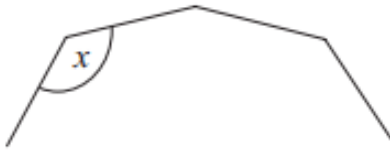
Extension: A shape has interior angle 170° . How many sides does it have?

Practice Questions

Try to do these questions without checking back



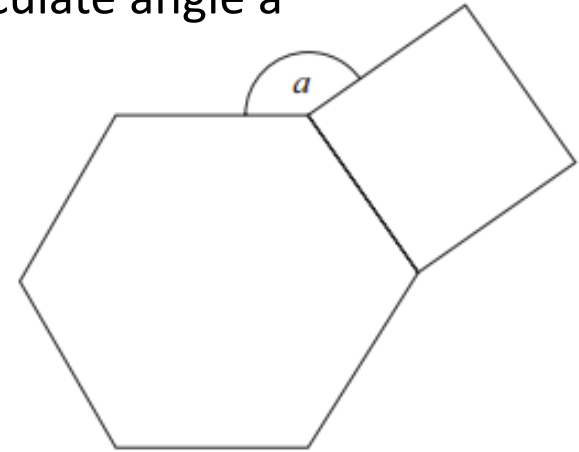
Work out the size of an exterior angle of a regular pentagon.



The diagram shows part of a **regular** 10-sided polygon.

Work out the size of the angle marked x .

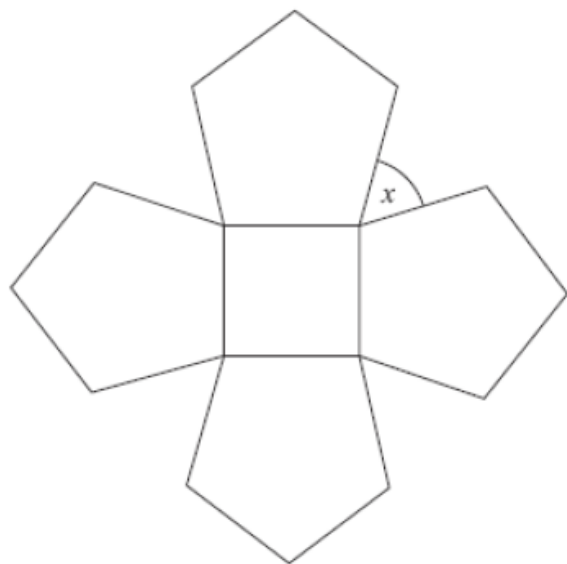
Calculate angle a



Each exterior angle of a regular polygon is 30° .

Work out the number of sides of the polygon.

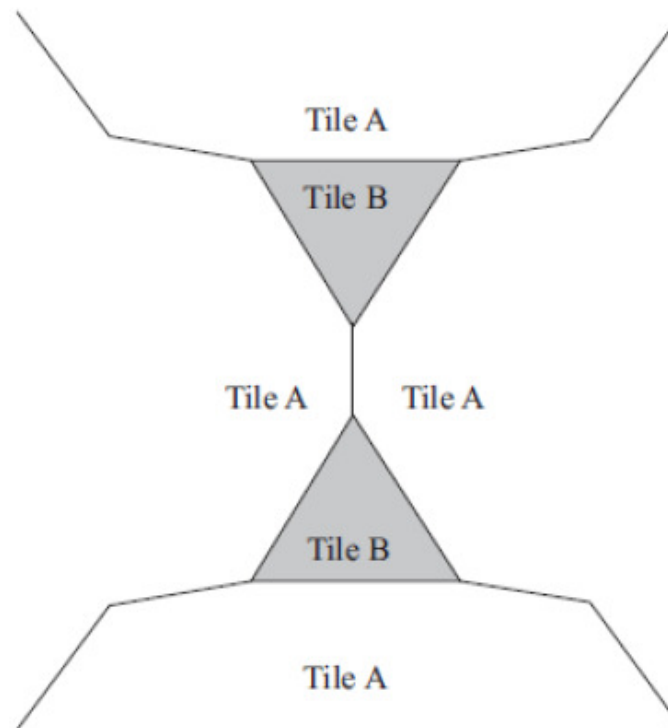
The size of each interior angle of a regular polygon is 156° . Work out the number of sides of the polygon.



The diagram shows 4 regular pentagons.

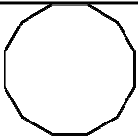
Work out the size of angle x

A pattern is made up of two types of tile. Tile A and Tile B are both regular polygons

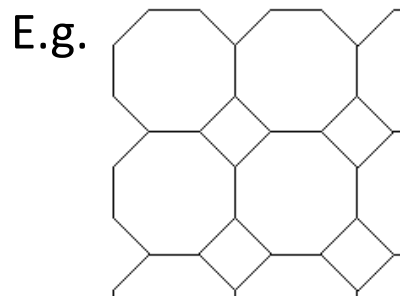


Work out the number of sides tile A has

Complete the table below

Shape	Sketch	Sides	Exterior Angle Size	Interior Angle Size
Square		4		
			120°	
				108°
			36°	
Octagon				
		6		
		12		

Extension: Using this information, what shapes will tessellate?



For tessellations:
Around each point
angles add to 360°.

e.g.

Octagon has interior angle 135°
Square has interior angle 90°
Octagon + Octagon + Square = 360°