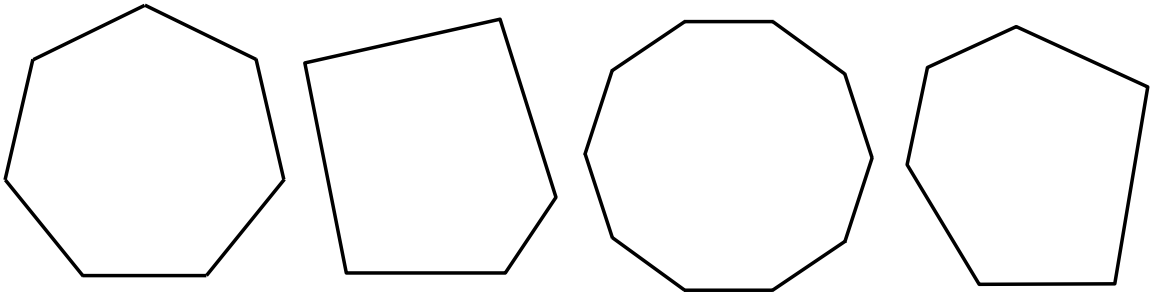
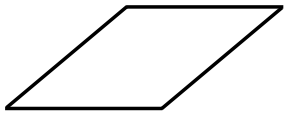
Regular and irregular polygons

1. Label each shape with its name :



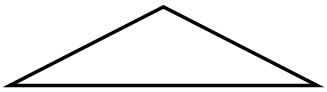
2. Explain why the following shapes are **not** regular polygons:

a) Rhombus



_____
_____

b) Isosceles triangle



_____
_____

c) Rectangle

_____
_____

The sum of exterior and interior angles for any polygon

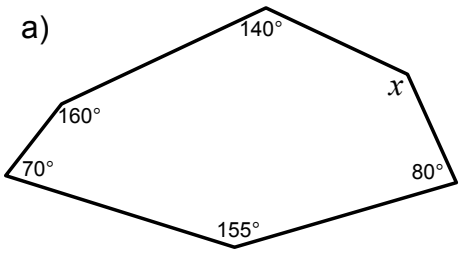
1. Work out the sum of the interior angles of an octagon

2. Work out the sum of the exterior angles of a heptagon

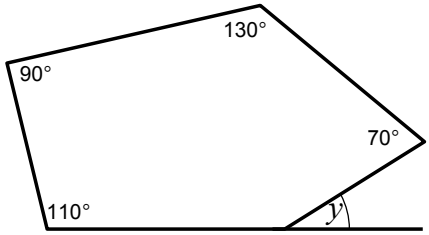
3. Work out the sum of the interior angles of a 12-sided polygon

4. Find the missing angles

a)



b)



Angles in regular polygons

For **any** polygon with n sides:	For a **regular** polygon:
Interior angle + Exterior angle $= 180^o$ The exterior angles sum to 360° The interior angles sum to $(n-2)\times 180$	Exterior angle $= \frac{360^o}{n}$ Interior angle $= \frac{(n-2)\times 180^o}{n}$

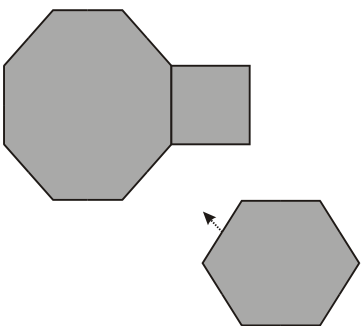
1. Use the rules to complete the following table:

Polygon	Sides	Sum of exterior angles	Sum of interior angles	For regular shape	
				Exterior angle	Interior angle
Pentagon					
Hexagon					
Nonagon					
Decagon					
Pendedecagon					

2. Dave says “There is a regular polygon with exterior angles of 50°”.
Explain why Dave is **wrong**

3. John says “There is a regular polygon with interior angles of 170°”.
Explain why John is **correct**

4. A pupil has three tiles. One is a regular octagon, one is a regular hexagon, and one is a square. The side length of each tile is the same.
The pupil says the hexagon will fit exactly like this.



Not drawn accurately

Show calculations to prove that the pupil is **wrong**.

Problem solving with polygons

1. Find the number of sides of a regular polygon with:

a) exterior angles of 15^o

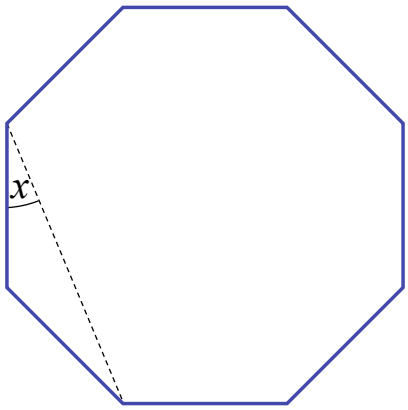
b) interior angles of 135^o

c) an interior angle sum of 2700^o

2. Use the rules *in reverse* to complete the following table:

Name	Sides	Sum of interior angles	For regular shape	
			Exterior angle	Interior angle
			30	
				162
		1080		

3. The diagram shows a regular octagon.
Find the size of angle x



4. Find the size of the smallest angle is this irregular pentagon