

# Year 8 Core - Angles in Parallel Lines and Polygons ANSWERS

1. Work out the size of the unknown angles.

a)  $a = 128.7^\circ$

b)  $b = 101.8^\circ$

c)  $c = 53.8^\circ$

d)  $d = 35.5^\circ$

Discuss your reasons with a partner.

5. Here are some parallelograms.

Find the unknown sides and angles and label the diagrams.

a)  $5\text{ cm}$

b)  $65\text{ mm}$

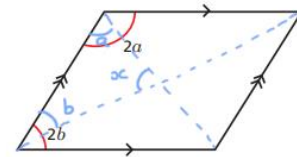
2. Are the pairs of angles alternate, corresponding or neither?

a) corresponding

b) neither

c) alternate

6. Prove that the diagonals of a rhombus intersect at right angles. You can assume that a diagonal bisects each angle.



Show all your workings.

$$2a + 2b = 180 \text{ because co-interior angles sum to } 180.$$

$$\Rightarrow a + b = 90$$

$$x = 180 - (a + b)$$

$$= 180 - 90$$

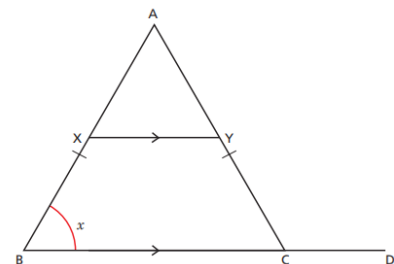
$$= 90 \therefore \text{the diagonals intersect at right angles.}$$

3. Work out the size of the exterior angle of each polygon. Then work out the sum of the exterior angles.

a)  $a = 50^\circ$   
 $b = 50^\circ$   
 $c = 130^\circ$   
 $d = 130^\circ$

$a + b + c + d = 360^\circ$

7. ABC is an isosceles triangle. Line segments XY and BD are parallel.



a) Write an expression in terms of x for the size of each angle.

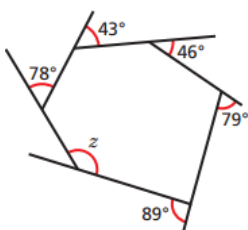
$$\angle ACB = x \quad \angle ACD = 180 - x$$

$$\angle AXC = x \quad \angle BCY = 180 - x$$

$$\angle AXY = x \quad \angle XYC = 180 - x$$

$$\angle BAC = 180 - 2x$$

4. Here is an irregular hexagon.



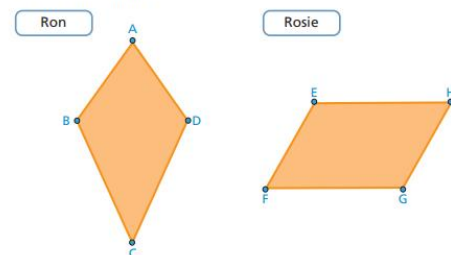
a) Work out the size of angle z

$z = 155^\circ$

b) Did you use rules of interior angles or exterior angles?

Circle your answer

8. Ron and Rosie are using some geometric software to make kites. They make these shapes.



a) Who has made a kite? Ron

b) Explain why one shape is a kite and the other is not.

ABCD has two pairs of equal adjacent sides and one pair of equal opposite angles therefore it is a kite.

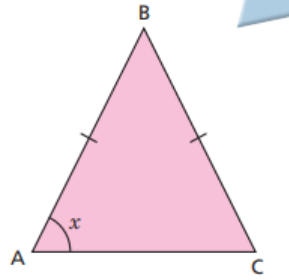
# Year 8 Higher - Angles in Parallel Lines and Polygons ANSWERS

1.

ABC is an isosceles triangle.

a) Write an expression for the size of angle ACB.  $x$

b) Show that angle ABC =  $180 - 2x$   
Give reasons to support your answer.

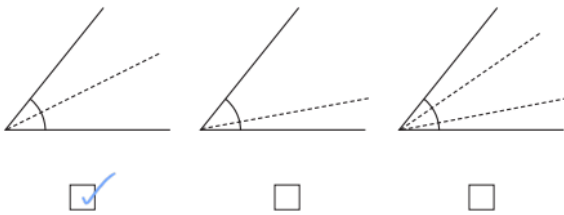


$\angle ACB = x$  because in an isosceles triangle two angles are equal.

$\angle ABC = 180 - (x + x) = 180 - 2x$  because angles in a triangle sum to  $180^\circ$ .

2.

a) One of the diagrams shows an angle bisector.  
Tick the diagram that shows an angle bisector.

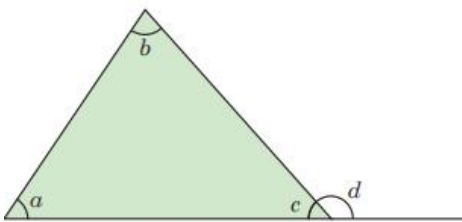


b) Explain why the others are not angle bisectors.

They do not cut the angles in half.

3.

A triangle has interior angles  $a$ ,  $b$  and  $c$ .



$a + b + c = 180$  because angles in a triangle sum to  $180^\circ$ .

$c + d = 180$  because angles on a straight line sum to  $180$ .

$$a + b + c = c + d$$

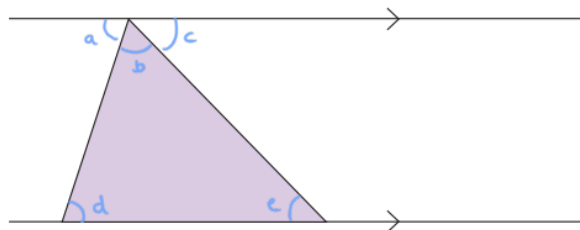
$$\therefore a + b = d$$

Show that  $d = a + b$ .

Give reasons to support your answer.

4.

Use rules of parallel lines to prove that the sum of the angles in a triangle is  $180^\circ$ .



$a + b + c = 180$  because angles on a straight line sum to  $180$ .

$a = d$  and  $c = e$  because alternate angles are equal.

$$b + d + e = b + a + c = 180$$