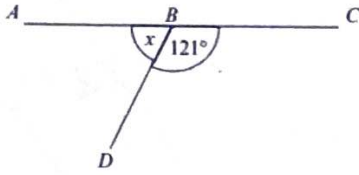


Year 9 Core – Angles: parallel lines and polygons

1. ABC is a straight line. Work out the size of the angle marked x.



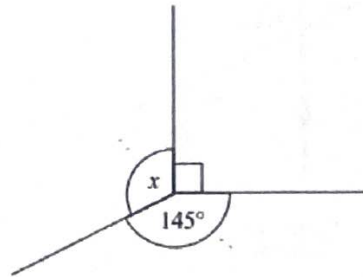
$$x = 180 - 121$$

$$= 59^\circ$$

angles on a straight line sum to 180°

2

Work out the size of the angle marked x.

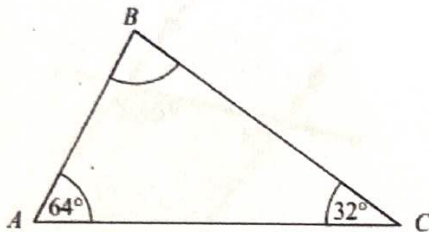


$$x = 360 - 90 - 145$$

$$= 125^\circ$$

angles around a point sum to 360°

3. Work out the size of angle ABC

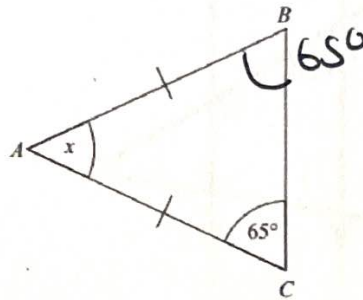


$$\angle ABC = 180 - 64 - 32$$

$$= 84^\circ$$

angles in a triangle sum to 180°

4. ABC is an isosceles triangle, work out the size of angle x.



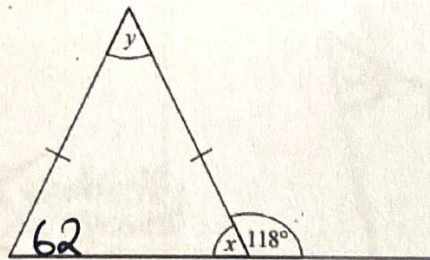
$$\angle ABC = 65^\circ$$

Base angles of an isosceles triangle are equal

$$x = 180 - 65 - 65$$

$$= 50^\circ$$

5



(a) Work out the size of the angle marked x. $180 - 118^\circ = 62^\circ$

(b) Work out the size of the angle marked y. $180 - 62 - 62 = 56^\circ$

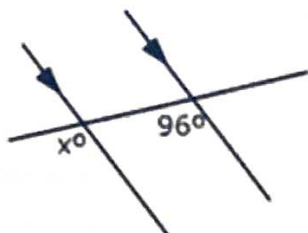
(c) Give reasons for your answer.

angles on a straight line sum to 180°
 Base angles in an isosceles triangle are equal

angles in a triangle sum to 180°

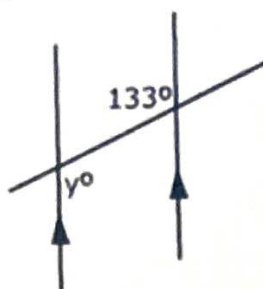
Year 9 Higher – Angles; parallel lines and polygons

1. Find the missing angle – give a reason for your answer.



$x = 96^\circ$
Corresponding angles are equal

2. Find the missing angle – give a reason for your answer.



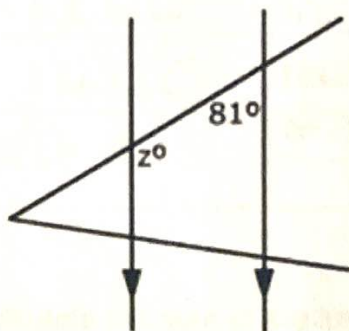
$y = 133^\circ$
alternate angles are equal

3. Find the missing angle – give a reason for your answer.



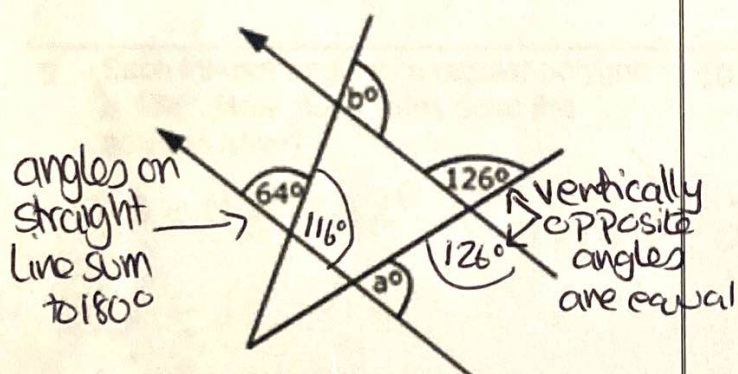
$x = 180 - 126$
 $= 54^\circ$
allied angles sum to 180°

4. Find the missing angle – give a reason for your answer.



$z = 180 - 81$
 $= 99^\circ$
allied angles sum to 180°

5. Find the missing angles – give reasons for your answer.



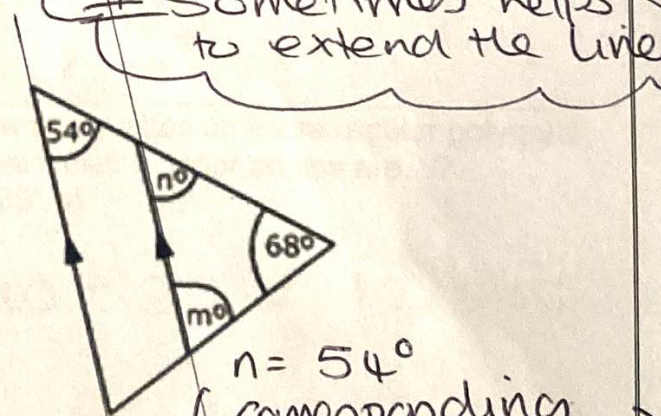
angles on straight line sum to 180°

vertically opposite angles are equal

$a = 180 - 126$
 $= 54^\circ$ (allied angles sum to 180°)

$b = 116^\circ$ (corresponding angles are equal)

6. Find the missing angles – give reasons for your answer.



$n = 54^\circ$
(corresponding angles are equal)

$m = 180 - 68 - 54$
 $= 58^\circ$
(angles in a triangle sum to 180°)

7 Complete the table

Name of regular polygon	Number of Sides	Size of exterior angle	Sum of all interior angles	Size of interior angle
Equilateral triangle	3	$360^\circ \div 3 = 120^\circ$	$1 \times 180^\circ = 180^\circ$	$180 \div 3 = 60^\circ$
Square	4	$360^\circ \div 4 = 90$	$2 \times 180^\circ = 360^\circ$	$360 \div 4 = 90^\circ$
Pentagon	5	72°	540°	$540 \div 5 = 108^\circ$
Hexagon	6	60°	720°	$720 \div 6 = 120^\circ$
Heptagon	7	51.43°	900°	$900 \div 7 = 128.57^\circ$
Octagon	8	45°	1080°	$1080 \div 8 = 135^\circ$
Nonagon	9	40°	1260	$1260 \div 9 = 140^\circ$
Decagon	10	36°	1440	$1440 \div 10 = 144^\circ$
n-sided polygon	n	$360^\circ \div n$	$(n-2) \times 180^\circ$	$\frac{(n-2) \times 180}{n}$

8. What is each interior angle of a regular polygon with 14 sides?

$$\frac{(14-2) \times 180}{14} = 154.29^\circ$$

9. Calculate the sum of the interior angles of a polygon with 22 sides.

$$\begin{aligned} &(n-2) \times 180 \\ &= (22-2) \times 180 \\ &= 20 \times 180 \\ &= 3600^\circ \end{aligned}$$

9. Each interior angle of a regular polygon is 168° . How many sides does the polygon have?

$$180 - 168 = 12^\circ \text{ (exterior angle)}$$

$$360 \div 12 = 30$$

30 sides.

10. How many sides do these regular polygons have if their exterior angles are...?

a) 30° b) 18°

a) $360 \div 30 = 12$ sides

b) $360 \div 18 = 20$ sides.