Angles - Worksheet

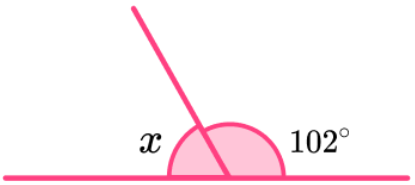
Skill

Group A - Angle Rules

Work out the value of x in each diagram below using angle rules.

(Diagrams are not drawn to scale)

1)



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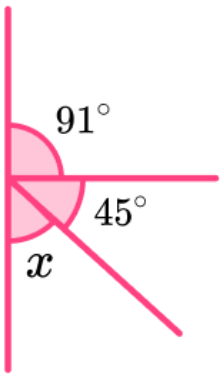
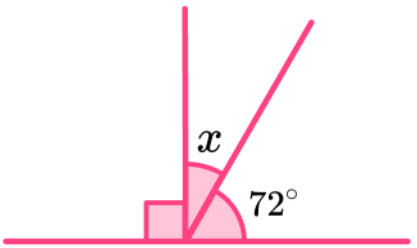
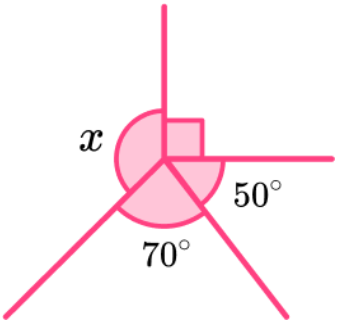


3)



4)

5)



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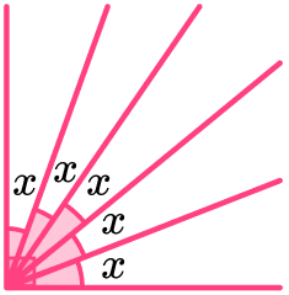
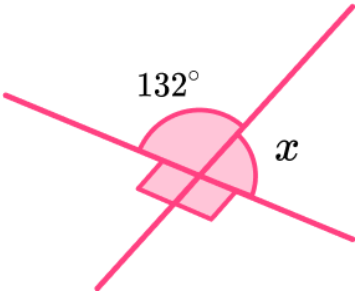


7)



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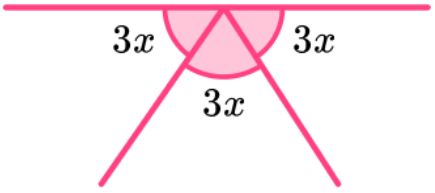

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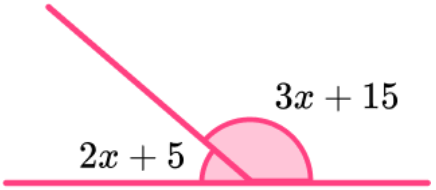

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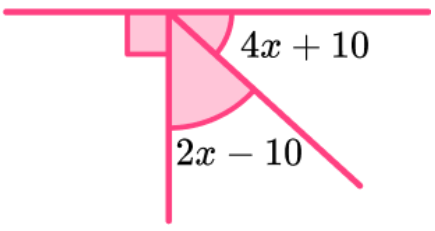

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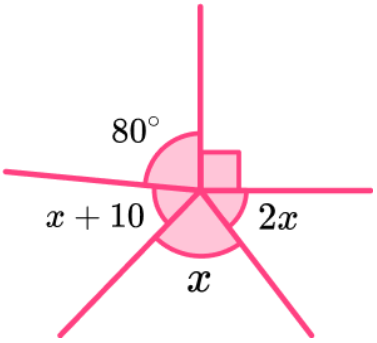
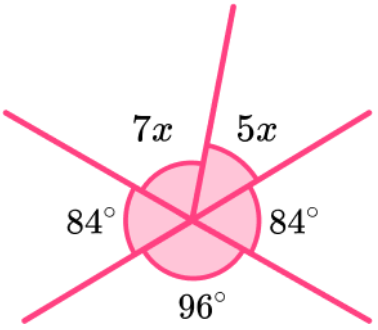


12)



Angles - Worksheet

Group B - Angles in polygons

Determine the size of each interior angle for the regular polygon stated.

1) Equilateral triangle

2) Square

3) Regular Hexagon

4) Regular decagon

5) Regular pentagon

6) Regular octagon

7) Regular dodecagon
(12 sides)

8) Regular nonagon
(9 sides)

9) Regular icosagon
(20 sides)

10) Regular heptagon
(7 sides)

11) Regular hendecagon
(11 sides)

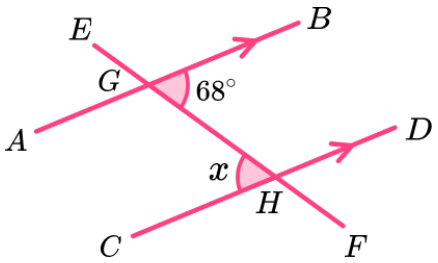
12) Regular n-agon
(n sides)

Group C - Angles in parallel lines

Work out the missing angle, x. Give reasons for your answers.

(Diagrams are not drawn to scale)

1)



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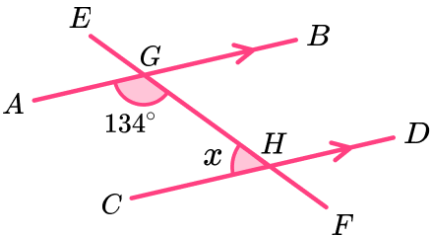

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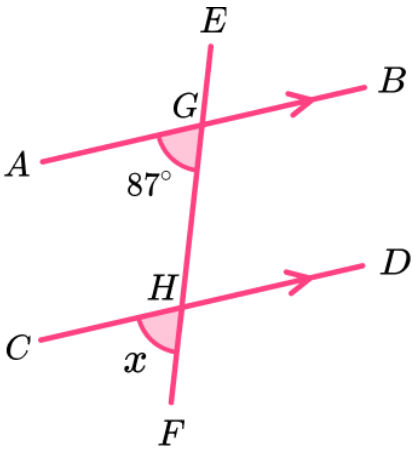

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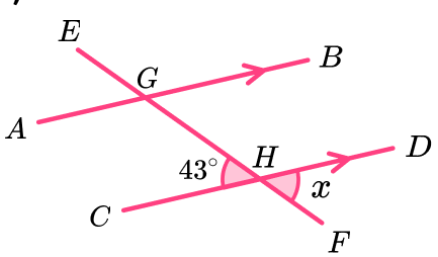

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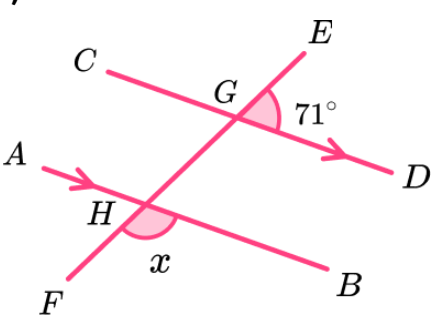

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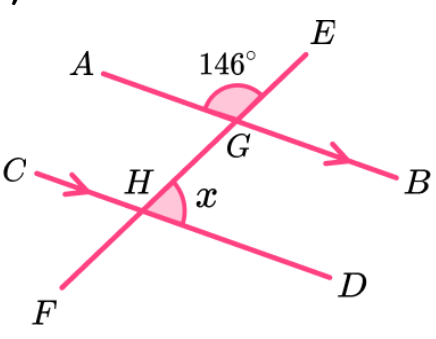
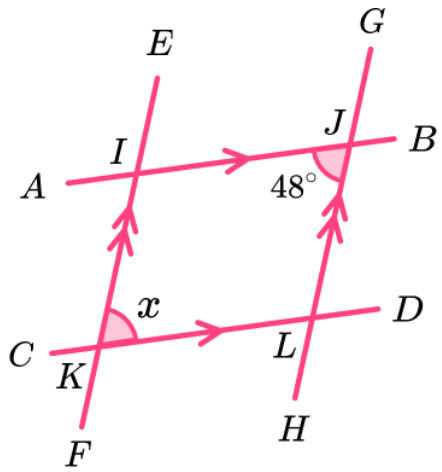


Angles - Worksheet

7)



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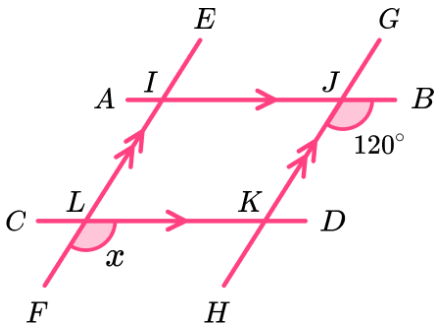

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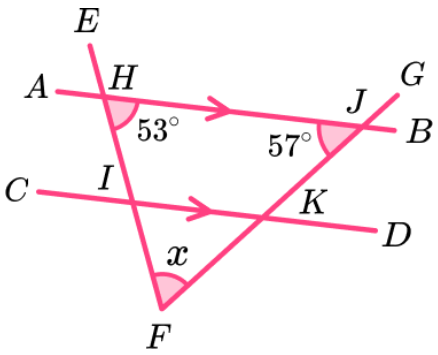

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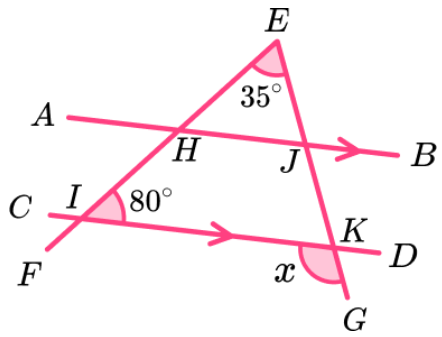

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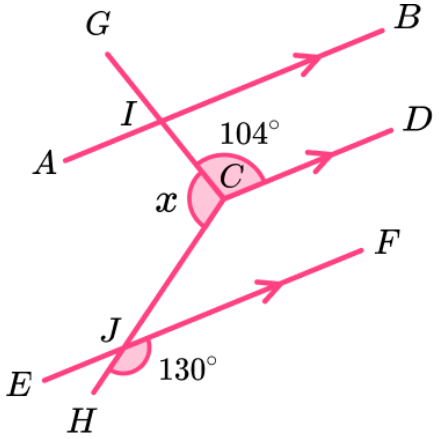

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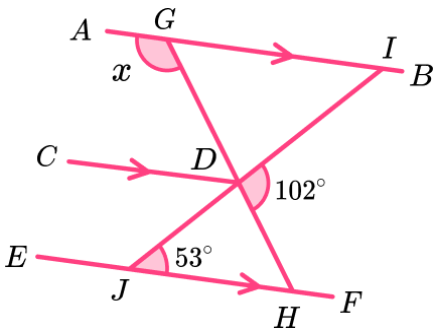


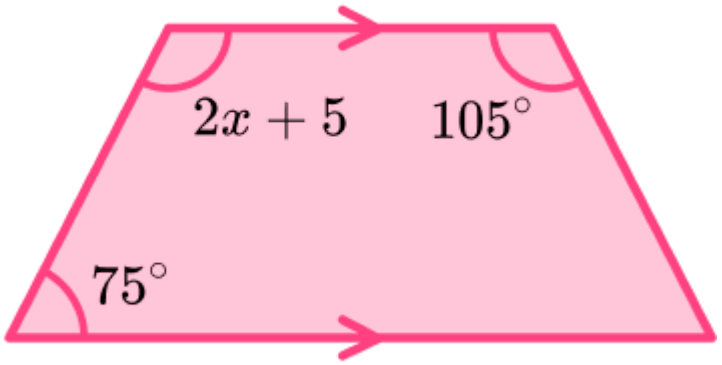
Angles - Worksheet

Applied

1) **(a)** Tony measures two vertically opposite angles. He measures them to be 70^o and 80^o. Is he correct? Explain your answer.

(b) Chris says "an isosceles triangle contains two obtuse angles". Is he correct? Explain your answer.

2) **(a)** Calculate the value of x.



(b) How many lines of symmetry does this trapezium have?

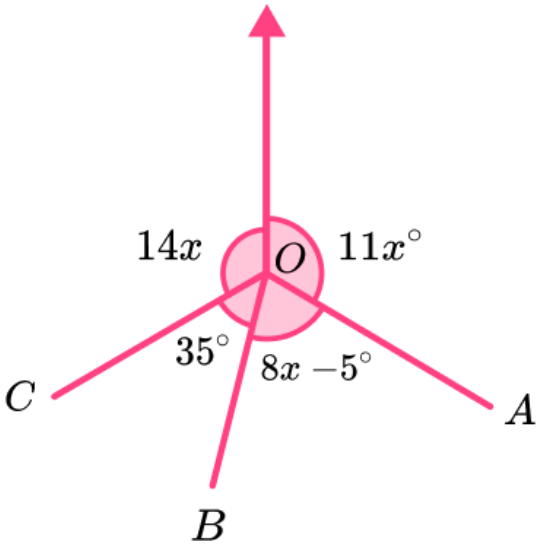
3) Two straight lines AB and CD intersect at the point M. Angle AMC is half of angle BMC. Calculate the size of the angle BMC.

4) **(a)** The exterior angle of a regular polygon is 120^o. What is the specific name of the polygon?

(b) The interior angle of a regular polygon is three times the size of the exterior angle. How many sides does the polygon have?

Angles - Exam Questions

1) **(a)** Persons A, B, and C are standing on the green of a golf course.
The hole is at point O.



What is the three figure bearing of A from O?

.....

(4)

(b) What is the bearing of B from O?

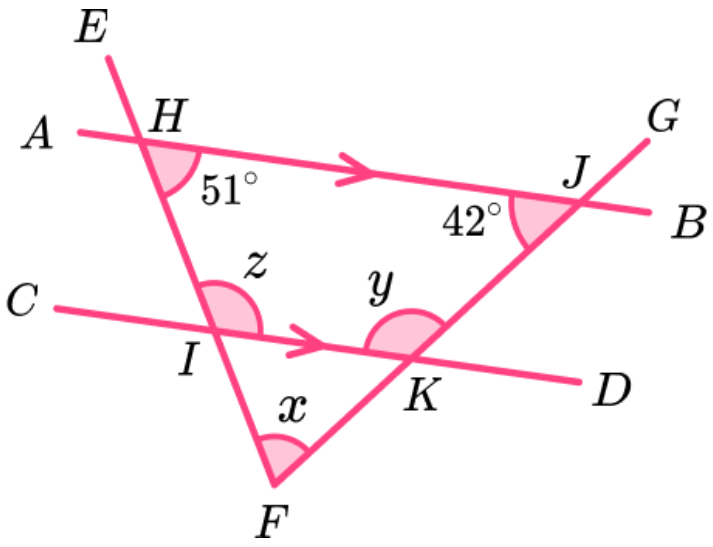
.....

(2)

(6 marks)

Angles - Exam Questions

2) Using the diagram below, calculate the value of $y + z - x$.



.....

(5 marks)

3) The sum of interior angles for a polygon with n sides is 1800^{o}.
Determine the number of sides of the polygon, n.

.....

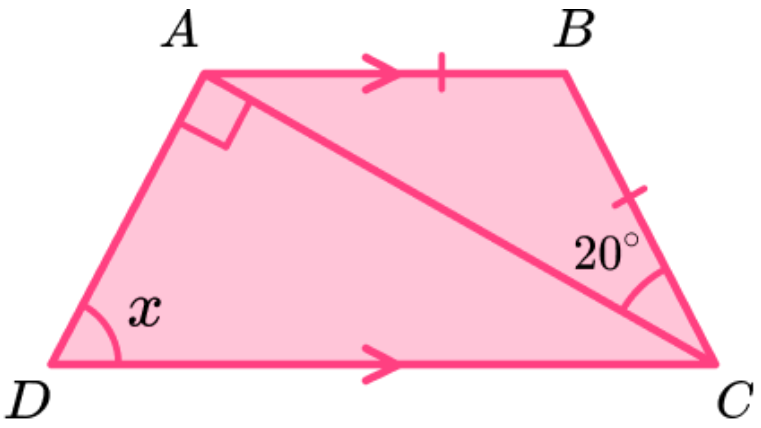
(3 marks)

Angles - Exam Questions

4) ABCD is a trapezium with the following properties:

- AB is parallel to CD
- AB=BC
- Angle BCA = 20^o
- Triangle ACD is a right angle triangle.

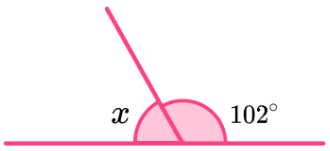
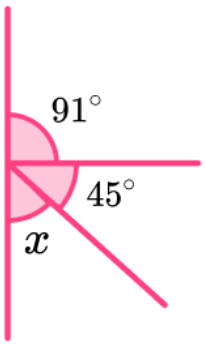
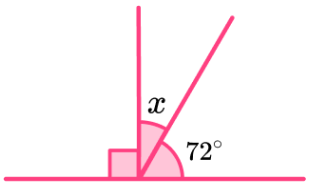
Calculate the value of x. State any reasons in your working.



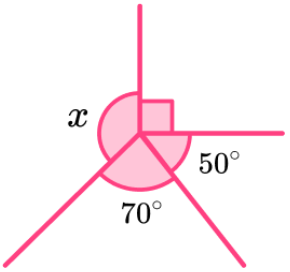
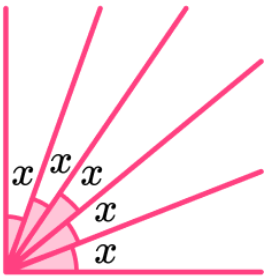
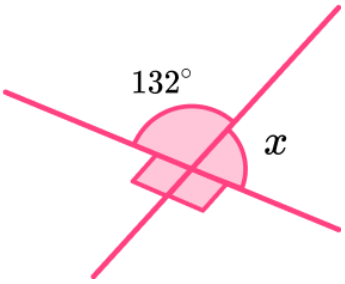
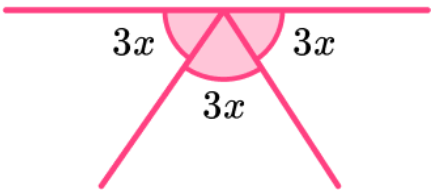
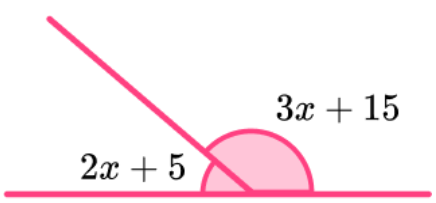
.....

(3 mark)

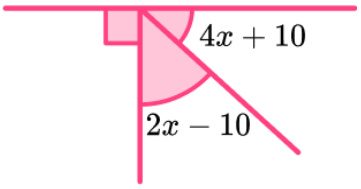
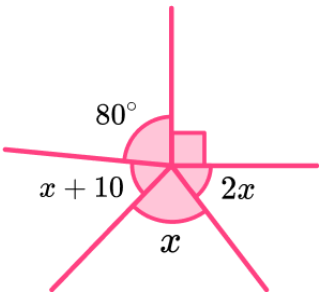
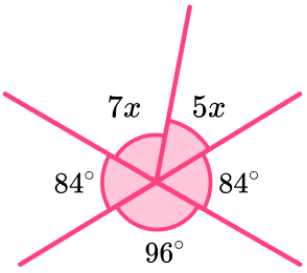
Angles - Answers

	Question	Answer
	Skill Questions	
Group A	Work out the value of x in each diagram below using angle rules. (Diagrams are not drawn to scale.) **1)**  **2)**  **3)**  **4)**  	**1)** $x = 78^o$ **2)** $x = 44^o$ **3)** $x = 18^o$ **4)** $x = 50^o$

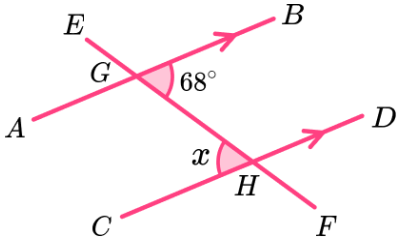
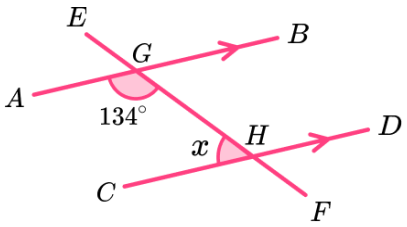
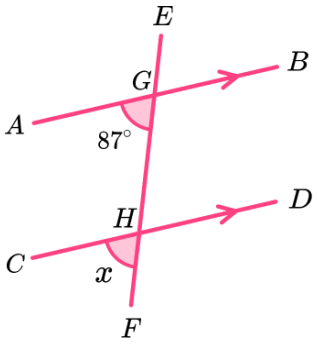
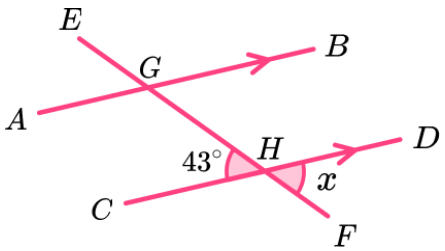
Angles - Answers

Group A contd	**5)**  	**5)** $x = 150^o$
	6)  	**6)** $x = 18^o$
	7)  	**7)** $x = 48^o$
	8)  	**8)** $x = 20^o$
	9)  	**9)** $x = 32^o$

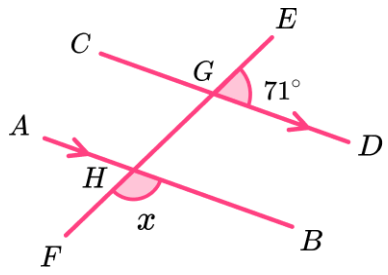
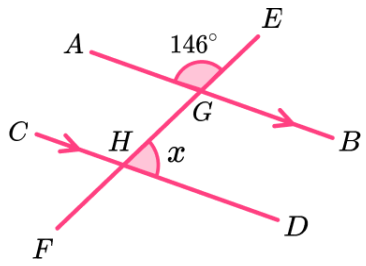
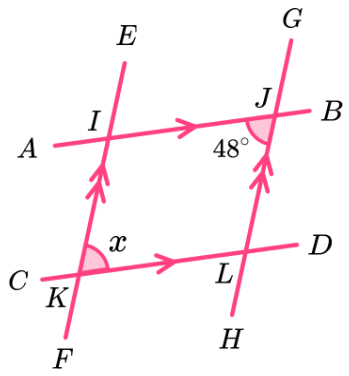
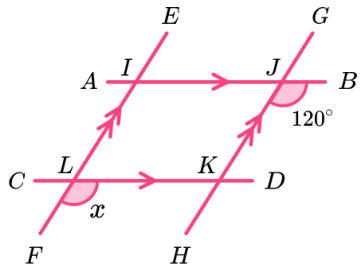
Angles- Answers

Group A contd	**10)**  **11)**  **12)**  	**10)** $x = 15^o$ **11)** $x = 45^o$ **12)** $x = 8^o$
Group B	Determine the size of each interior angle for the regular polygon stated. **1)** Equilateral triangle **2)** Square **3)** Regular Hexagon **4)** Regular decagon **5)** Regular pentagon **6)** Regular octagon **7)** Regular dodecagon (12 sides) **8)** Regular nonagon (9 sides)	**1)** 60^o **2)** 90^o **3)** 120^o **4)** 144^o **5)** 108^o **6)** 135^o **7)** 150^o **8)** 140^o

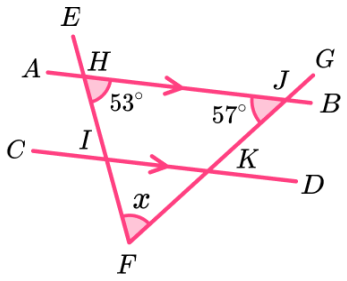
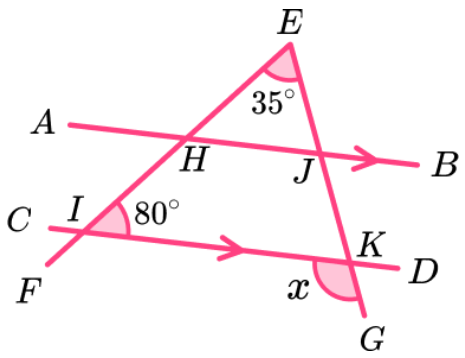
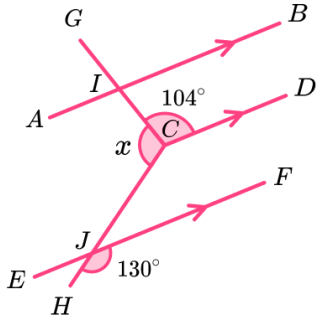
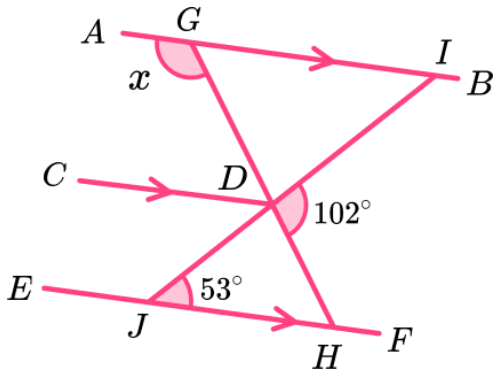
Angles - Answers

Group B contd	**9)** Regular icosagon (20 sides) **10)** Regular heptagon (7 sides) **11)** Regular hendecagon (11 sides) **12)** Regular n-agon (n sides)	**9)** 162^o **10)** 128.57^o (2dp) **11)** 147.27^o (2dp) **12)** $\frac{180(n-2)}{n}$ or $180 - \frac{360}{n}$
Group C	Work out the missing angle, x. Give reasons for your answers. (Diagrams are not drawn to scale.) **1)**  **2)**  **3)**  **4)**  	**1)** $x = 68^o$ BGH is alternate to GHC. Alternate angles are equal. **2)** $x = 46^o$ AGH is co-interior with GHC. The sum of co-interior angles is 180^o. $180 - 134 = 46$ 3) $x = 87^o$ AGH is corresponding to CHF. Corresponding angles are equal. **4)** $x = 43^o$ GHC is vertically opposite DHF. Vertically opposite angles are the same.

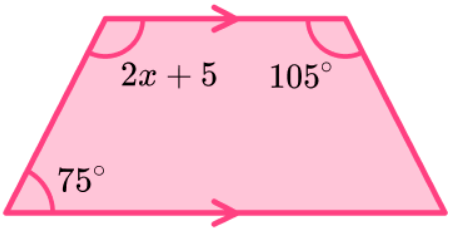
Angels - Answers

Group C contd	**5)**  **6)**  **7)**  **8)**  	**5)** $x = 109^o$ EGD is on a straight line with DGH. The sum of angles on a straight line is 180^o. $180 - 71 = 109^o$. DGH is corresponding to BHF. Corresponding angles are equal. **6)** $x = 34^o$ AGE is vertically opposite BGH. Vertically opposite angles are equal. BGH is co-interior with GHD. The sum of co-interior angles is 180^o. $180 - 146 = 34^o$. **7)** $x = 48^o$ IJL is co-interior to JLK. The sum of co-interior angles is 180^o. $180 - 48 = 132^o$. JLK is co-interior to LKI. The sum of co-interior angles is 180^o. $180 - 132 = 48^o$. Note - opposite angles of a parallelogram are equal. **8)** $x = 120^o$ BJK is corresponding to DKH. Corresponding angles are equal. DKH is corresponding to KLF. Corresponding angles are equal.

Angels - Answers

Group C contd	**9)**  **10)**  **11)**  **12)**  	**9)** $x = 70^o$ FHJ is a triangle. The sum of angles in a triangle is 180^o. $180 - (53 + 57) = 70^o$. **10)** $x = 115^o$ EKI is a triangle. The sum of angles in a triangle is 180^o. $180 - (80 + 35) = 65^o$. JKG is a straight line. The sum of angles on a straight line is 180^o. $180 - 65 = 115^o$. **11)** $x = 126^o$ FJH is corresponding to DCJ. Corresponding angles are equal. Angles around the point C are: 104^o, 130^o and x. The sum of angles at a point is 360^o. $x = 360 - (104 + 130) = 126^o$. **12)** $x = 131^o$ IDJ is a straight line. The sum of angles on a straight line is 180^o. $180 - 102 = 78^o$. DHJ is a triangle. The sum of angles in a triangle is 180^o. Angle DHJ = $180 - (53 + 78) = 49^o$ AGH is co-interior with GHJ $180 - 49 = 131^o$

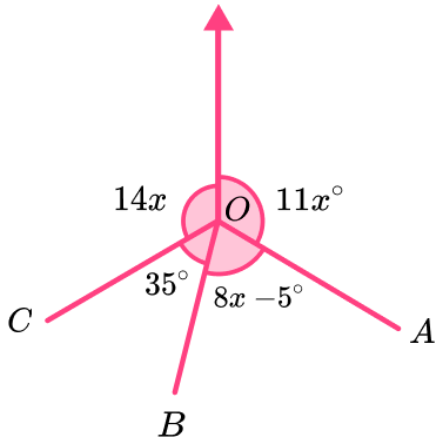
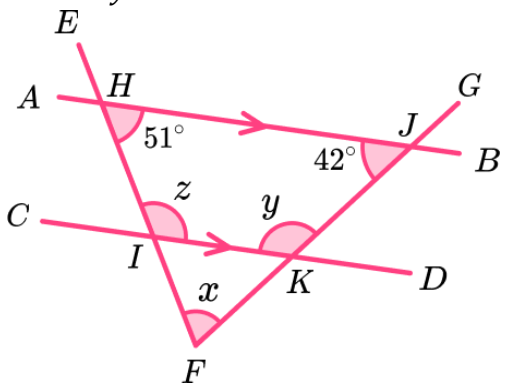
Angles - Answers

	Question	Answer
	Applied Questions	
1)	**a)** Tony measures two vertically opposite angles. He measures them to be 70^o and 80^o. Is he correct? Explain your answer. **b)** Chris says "an isosceles triangle contains two obtuse angles". Is he correct? Explain your answer.	**a)** Tony is wrong because vertically opposite angles are equal. **b)** An obtuse angle angle has a range of $90 < x^o \leq 180$. The sum of angles in a triangle is 180^o. Therefore Chris is incorrect because if two angles in a triangle are obtuse then the minimum sum of these two angles would be greater than 180^o.
2)	**a)** Calculate the value of x.  **b)** How many lines of symmetry does this trapezium have?	**a)** Co-interior angles add up to 180^o. $2x + 5 + 75 = 180$ $2x + 80 = 180$ $2x = 100$ $x = 50$ **b)** $2x + 5 = 2 \times 50 + 5 = 105$ Therefore there is 1 line of symmetry (vertical through the centre)
3)	Two straight lines AB and CD intersect at the point M. Angle AMC is half of angle BMC. Calculate the size of angle BMC.	As AMC is half of BMC, the ratio of their sizes is $1:2$. $1 + 2 = 3$ The sum of angles on a straight line is 180^o. $180 \div 3 = 60$ AMC = $60 \times 1 = 60^o$ BMC = $60 \times 2 = 120^o$

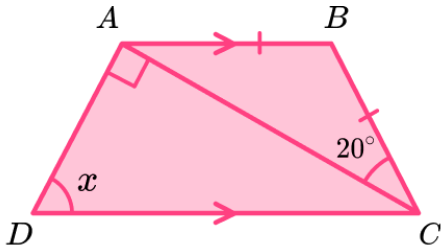
Angles - Answers

4	**a)** The exterior angle of a regular polygon is 120^o. What is the specific name of the polygon? **b)** The interior angle of a regular polygon is three times the size of the exterior angle. How many sides does the polygon have?	**a)** $360 \div 120 = 3$ Equilateral Triangle **b)** The sum of angles on a straight line is 180^o. The ratio of the size of the interior angle to the exterior angle is $3:1$. $3 + 1 = 4$ $180 \div 4 = 45$ The sum of exterior angles is 360^o. $360 \div 45 = 8$

Angles - Mark Scheme

	Question	Answer	
	Exam Questions		
1) (a)	Persons A, B, and C are standing on the green of a golf course. The hole is at point O.  What is the three figure bearing of A from O?	**(a)** $11x + 8x - 5 + 35 + 14x = 360$ $33x + 30 = 360$ $33x = 330$ $x = 10$ $11x = 110^o$	**(1)** **(1)** **(1)** **(1)**
(b)	What is the bearing of B from O?	**(b)** $8x - 5 = 8 \times 10 - 5 = 75$ $110 + 75 = 185^o$	**(1)** **(1)**
2)	Using the diagram below, calculate the value of $y + z - x$.  	$y = 180 - 42 = 138$ $z = 180 - 51 = 129$ FHJ is a triangle The sum of angles in a triangle is 180^o. $x = 180 - (51 + 42) = 87$ $y + z - x = 138 + 129 - 87 = 180.$	**(1)** **(1)** **(1)** **(1)** **(1)**
3)	The sum of interior angles for a polygon with n sides is 1800^o. Determine the number of sides of the polygon, n.	$1800 = 180(n - 2)$ $10 = n - 2$ $n = 12$	**(1)** **(1)** **(1)**

Angles - Mark Scheme

4)	ABCD is a trapezium with the following properties: • AB is parallel to CD • AB=BC • Angle BCA = 20^o • Triangle ACD is a right angle triangle. Calculate the value of x.  	BAC = BCA = 20^o (Isosceles triangle) BAC = ACD (Alternate angles are equal) $x = 180 - (90 + 20) = 70^o$ (The sum of angles in a triangle is 180^o).	**(1)** **(1)** **(1)**