



ACHIEVE ACADEMY

GCSE Maths — Higher Tier

Angles & Parallel Lines · Practice Booklet

NAME: _____

CLASS: _____

DATE: _____

☐ Developing

☒ Secure

☐ Greater Depth

Answer every question in the working space provided. Method marks are available for correct working even if the final answer is wrong. Check the time allowed with your tutor before you start.

Angles & Parallel Lines

Total marks available: 110

● Angles & Parallel Lines

✓ $x = 17$, angle = 85°

Q1 · ● Developing · 4 marks

METHOD

Angles on a straight line sum to 180° .

$$4x + 17 + x + 10 + 68 = 180$$

$$5x + 95 = 180$$

$$5x = 85$$

$$x = 17$$

$$\text{Angle} = 4x + 17 = 4 \times 17 + 17 = 85^\circ$$

✓ $x = 18$, angle = 36°

Q2 · ● Developing · 4 marks

METHOD

Angles on a straight line sum to 180° .

$$2x + 4x - 2 + 74 = 180$$

$$6x + 72 = 180$$

$$6x = 108$$

$$x = 18$$

$$\text{Angle} = 2x = 2 \times 18 + 0 = 36^\circ$$

✓ $x = 6$, angle = 26°

Q3 · ● Developing · 4 marks

METHOD

Angles on a straight line sum to 180° .

$$x + 20 + 2x + 21 + 121 = 180$$

$$3x + 162 = 180$$

$$3x = 18$$

$$x = 6$$

$$\text{Angle} = x + 20 = 1 \times 6 + 20 = 26^\circ$$

✓ $x = 15$, angle = 81°

Q4 · ● Developing · 4 marks

METHOD

Angles on a straight line sum to 180° .

$$4x + 21 + 3x - 6 + 60 = 180$$

$$7x + 75 = 180$$

$$7x = 105$$

$$x = 15$$

$$\text{Angle} = 4x + 21 = 4 \times 15 + 21 = 81^\circ$$

✓ $x = 10$, angle = 8°

Q5 · ● Developing · 4 marks

METHOD

Angles on a straight line sum to 180° .

$$x - 2 + 4x - 5 + 137 = 180$$

$$5x + 130 = 180$$

$$5x = 50$$

$$x = 10$$

$$\text{Angle} = x - 2 = 1 \times 10 - 2 = 8^\circ$$

✓ $x = 25$, angle = 10°

Q6 · ● Developing · 4 marks

METHOD

Angles on a straight line sum to 180° .

$$x - 15 + 3x - 7 + 102 = 180$$

$$4x + 80 = 180$$

$$4x = 100$$

$$x = 25$$

$$\text{Angle} = x - 15 = 1 \times 25 - 15 = 10^\circ$$

✓ $x = 11$, angle = 28°

Q7 · ● Developing · 4 marks

METHOD

Angles on a straight line sum to 180° .

$$2x + 6 + 2x - 4 + 134 = 180$$

$$4x + 136 = 180$$

$$4x = 44$$

$$x = 11$$

$$\text{Angle} = 2x + 6 = 2 \times 11 + 6 = 28^\circ$$

✓ $x = 23$, angle = 85°

Q8 · ● Developing · 4 marks

METHOD

Angles on a straight line sum to 180° .

$$3x + 16 + x + 25 + 47 = 180$$

$$4x + 88 = 180$$

$$4x = 92$$

$$x = 23$$

$$\text{Angle} = 3x + 16 = 3 \times 23 + 16 = 85^\circ$$

✓ $x = 24$, angle = 34°

Q9 · ● Developing · 4 marks

METHOD

Angles on a straight line sum to 180° .

$$x + 10 + 4x + 20 + 30 = 180$$

$$5x + 60 = 180$$

$$5x = 120$$

$$x = 24$$

$$\text{Angle} = x + 10 = 1 \times 24 + 10 = 34^\circ$$

✓ $x = 24$, angle = 61°

Q10 · ● Developing · 4 marks

METHOD

Angles on a straight line sum to 180° .

$$3x - 11 + 3x + 23 + 24 = 180$$

$$6x + 36 = 180$$

$$6x = 144$$

$$x = 24$$

$$\text{Angle} = 3x - 11 = 3 \times 24 - 11 = 61^\circ$$

✓ 15

Q11 · ● Secure · 3 marks

METHOD

$$\text{Exterior angle} = 180 - 156 = 24^\circ$$

$$\text{Number of sides} = 360 \div 24 = 15$$

✓ $x = 8$

Q12 · ● Secure · 3 marks

METHOD

$$4x + 10 = x + 34$$

$$3x = 24$$

$$x = 8$$

✓ $x = 10$

Q13 · ● Secure · 3 marks

METHOD

$$4x - 11 = 2x + 9$$

$$2x = 20$$

$$x = 10$$

✓ 20

Q14 · ● Secure · 3 marks

METHOD

$$\text{Exterior angle} = 180 - 162 = 18^\circ$$

$$\text{Number of sides} = 360 \div 18 = 20$$

✓5

Q15 · ● Secure · 3 marks

METHOD

$$\text{Exterior angle} = 180 - 108 = 72^\circ$$

$$\text{Number of sides} = 360 \div 72 = 5$$

✓10

Q16 · ● Secure · 3 marks

METHOD

$$\text{Exterior angle} = 180 - 144 = 36^\circ$$

$$\text{Number of sides} = 360 \div 36 = 10$$

✓ $x = 4$

Q17 · ● Secure · 3 marks

METHOD

$$5x + 24 = x + 40$$

$$4x = 16$$

$$x = 4$$

✓ $x = 6$

Q18 · ● Secure · 3 marks

METHOD

$$2x + 24 = 5x + 6$$

$$-3x = -18$$

$$x = 6$$

✓ $x = 14$

Q19 · ● Secure · 3 marks

METHOD

$$2x + 11 = 4x - 17$$

$$-2x = -28$$

$$x = 14$$

✓8

Q20 · ● Secure · 3 marks

METHOD

$$\text{Exterior angle} = 180 - 135 = 45^\circ$$

$$\text{Number of sides} = 360 \div 45 = 8$$

✓ $x = 14$, angle = 23°

Q21 · ● Greater Depth · 4 marks

METHOD

$$2x - 5 + 5x + 87 = 180$$

$$7x + 82 = 180$$

$$7x = 98$$

$$x = 14$$

$$\text{Angle} = 2 \times 14 - 5 = 23^\circ$$

✓ $x = 12$, angle = 56°

Q22 · ● Greater Depth · 4 marks

METHOD

$$2x + 32 + 3x + 88 = 180$$

$$5x + 120 = 180$$

$$5x = 60$$

$$x = 12$$

$$\text{Angle} = 2 \times 12 + 32 = 56^\circ$$

✓ $x = 10$

Q23 · ● Greater Depth · 4 marks

METHOD

Exterior angles of a regular polygon sum to 360° , so each = $360 \div 9 = 40^\circ$

$$3x + 10 = 40$$

$$3x = 30$$

$$x = 10$$

$$\checkmark x = 3$$

Q24 · ● Greater Depth · 4 marks

METHOD

Exterior angles of a regular polygon sum to 360° , so each = $360 \div 12 = 30^\circ$

$$3x + 21 = 30$$

$$3x = 9$$

$$x = 3$$

$$\checkmark x = 10$$

Q25 · ● Greater Depth · 4 marks

METHOD

Exterior angles of a regular polygon sum to 360° , so each = $360 \div 5 = 72^\circ$

$$4x + 32 = 72$$

$$4x = 40$$

$$x = 10$$

$$\checkmark x = 20, \text{ angle} = 43^\circ$$

Q26 · ● Greater Depth · 4 marks

METHOD

$$2x + 3 + 2x + 97 = 180$$

$$4x + 100 = 180$$

$$4x = 80$$

$$x = 20$$

$$\text{Angle} = 2 \times 20 + 3 = 43^\circ$$

$$\checkmark x = 25, \text{ angle} = 64^\circ$$

Q27 · ● Greater Depth · 4 marks

METHOD

$$3x - 11 + 5x - 9 = 180$$

$$8x - 20 = 180$$

$$8x = 200$$

$$x = 25$$

$$\text{Angle} = 3 \times 25 - 11 = 64^\circ$$

$$\checkmark x = 6$$

Q28 · ● Greater Depth · 4 marks

METHOD

Exterior angles of a regular polygon sum to 360° , so each = $360 \div 12 = 30^\circ$

$$2x + 18 = 30$$

$$2x = 12$$

$$x = 6$$

$$\checkmark x = 21, \text{ angle} = 92^\circ$$

Q29 · ● Greater Depth · 4 marks

METHOD

$$4x + 8 + 4x + 4 = 180$$

$$8x + 12 = 180$$

$$8x = 168$$

$$x = 21$$

$$\text{Angle} = 4 \times 21 + 8 = 92^\circ$$

$$\checkmark x = 10$$

Q30 · ● Greater Depth · 4 marks

METHOD

Exterior angles of a regular polygon sum to 360° , so each = $360 \div 10 = 36^\circ$

$$x + 26 = 36$$

$$x = 10$$