



Unit 13: Geometry – properties of shapes (I)

Lesson 1: Measuring angles in degrees

→ pages 54–56

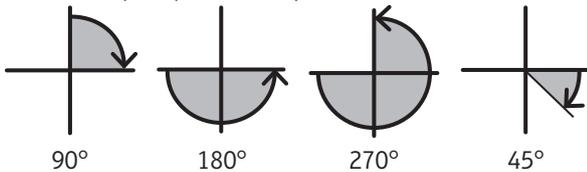
- Diagrams ticked: 2nd and 4th
 - Diagrams ticked: 1st, 3rd and 6th
 - 360° clockwise
 - 180° anticlockwise
 - 180° anticlockwise
 - 90° clockwise
 - 270° clockwise
 - 360° clockwise

| Starts facing | Turns | Now facing |
|---------------|--------------------|------------|
| whirlpool | 90° clockwise | island |
| harbour | 180° clockwise | island |
| island | 270° anticlockwise | rocks |
| island | 360° | island |
| island | 270° clockwise | whirlpool |

- 180° clockwise or anticlockwise
 - 90° clockwise or 270° anticlockwise
 - 45° clockwise or 315° anticlockwise
 - 135° anticlockwise or 225° clockwise
- Answers will vary; for example:
 - 1 □ and 5 △
 - 2 □ and 3 △
 - Fewest button pushes: 3 □ and 1 △

Reflect

Answers may vary; for example:



Lesson 2: Measuring with a protractor (I)

→ pages 57–59

- 50°
 - 25°
 - 80°
 - 42°
- Allow 2° either side:
 - 70°
 - 55°
 - 62°
 - 44°

- Each angle = 60°
 - Top = 45°
Bottom left = 60° Bottom right = 75°
- Richard has read the wrong scale; he needs to use the inner scale, starting on the right-hand side. The angle is acute and is 60°.
 - Emma has not aligned the zero line of the protractor with one of the lines of the angle. The angle is 50°.
- Allow 2° either side:
 - 80°
 - 61°
 - 28°

Reflect

Explanations may vary; for example:

Make sure the zero line of the protractor lines up with one of the angle lines. Then line up the centre mark with the exact point of the angle and follow the scale from the zero mark to the completed turn. Finally, read the angle from the scale.

Lesson 3: Measuring with a protractor (2)

→ pages 60–62

- Ticked: b) and c)
- Allow 2° either side:
 - 135°
 - 127°
 - 115°
 - 130°
- d c a b
- Allow 2° either side:
 - All three angles = 135°
 - 152°
- Allow 5° either side:

| Turns clockwise from: | Angle of turn |
|-----------------------|---------------|
| A to F | 140° |
| F to I | 140° |
| I to B | 115° |
| B to G | 120° |
| G to I | 125° |

Reflect

Answers will vary; for example:

Since the angle is obtuse you should read the scale where the value is greater than 90°. Use the scale where 0° is matched up to the other line.



Lesson 4: Drawing lines and angles accurately

→ pages 63–65

1. Check drawn angles.
2. Check drawn angles.
3. The missing length is 9.5 cm (allow 0.2 cm either way).
The missing angles are 50° and 50° .
4. Check that the triangles are drawn with angles of 45° , 60° and 75° .
All sides are different lengths.
5. Check that equilateral triangles are drawn with 3 angles of 60° and sides of 3 cm.

Reflect

Answers will vary. Look for angles that are accurately drawn at 45° and children drawing angles at different orientations.

Lesson 5: Calculating angles on a straight line

→ pages 66–68

1. a) I predict a is 130° because $180 - 50 = 130$.
b) I predict b is 60° because $180 - 120 = 60$.
2. a) 140° c) 80°
b) 35° d) 141°
3. a) a (45°) and h (135°) or b (145°) and g (35°)
b) c (20°) and d (100°) and f (60°) or a (45°) and d (100°) and g (35°)
4. a) 5° b) 30°
5. ? = 50° (a = 20° , b = 50° , c = 40°)

Reflect

Aki has correctly recognised that a right angle is 90° and $45 + 45 = 90$. However, the angle of a straight line is 180° , so to calculate the missing angle he needs to find $180 - 145 = 35$. The missing angle is 35° .

Lesson 6: Calculating angles around a point

→ pages 69–71

- 1 a) $360^\circ - 180^\circ = 180^\circ$
b) $360^\circ - 270^\circ = 90^\circ$
c) $360^\circ - 120^\circ = 240^\circ$

2. a) Angle a is 90° .
b) Angle b is 60° .
c) Angle c is 120° .
d) Angle d is 200° .
3. a) Children should draw an angle of 250° .
b) Children should draw an angle of 350° .
4. Max turned 105° .
5. $4 \times 90 = 360$
An obtuse angle is greater than 90° so 4 obtuse angles together would turn further than 360° , or a full turn. The circle therefore cannot be split into four obtuse angles.
6. a) 72° ($360 \div 5 = 72$)
b) 36° ($180 \div 5 = 36$)
c) 18° ($90 \div 5 = 18$)
d) Explanations may vary; for example:
The size of the angles is halved each time so the answers are halved.

Reflect

Answers will vary.

$360 - 110 = 250$, so the other 2 angles must add up to 250° together; for example:

120° and 130° ; 100° and 150° ; etc.

Lesson 7: Calculating lengths and angles in shapes

→ pages 72–74

1. Angles clockwise around shape from top left:
A: $90^\circ, 90^\circ, 45^\circ, 135^\circ$
B: $90^\circ, 45^\circ, 45^\circ$
C: $45^\circ, 90^\circ, 45^\circ$
D: $45^\circ, 45^\circ, 90^\circ$
E: $90^\circ, 90^\circ, 90^\circ, 90^\circ$
2. a) 75 mm
150 mm
 45°
b) 75 mm
150 mm
 135°
c) 150 mm
 270°
3. a = 105° b = 53° c = 107°
4. a = 120° b = 300° c = 60°

Reflect

Answers will vary; for example:

It is usually easier and quicker to use angle facts and calculate missing angles rather than measure them. Sometimes it is necessary to measure one angle to find other angles.



End of unit check

→ pages 75–77

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- a, b and g ($a = 15^\circ$, $b = 90^\circ$ and $g = 255^\circ$,
so: $15 + 90 + 255 = 360^\circ$)
 - a, b, c and f ($a = 15^\circ$, $b = 90^\circ$, $c = 45^\circ$ and $f = 30^\circ$,
so: $15 + 90 + 45 + 30 = 180^\circ$)
- $a = 70^\circ$ $b = 20^\circ$
Answers may vary but children should notice that
 $a + b = 90^\circ$.

Power puzzle

Star should be drawn in space provided.