Year 7 · Geometry: Shapes, Angles and Moves

Name: _____ Date: _____

Hi there! This sheet helps you practise moving shapes around the grid, finding missing angles, and working with 3D shapes and their nets. Take your time and draw a picture whenever it helps.

Warm-up

1. A regular hexagon has 6 sides. What is the size of one exterior angle?

2. The interior angles of a triangle are 55° and 80°. What is the third angle?

3. Two angles sit on a straight line. One is 130°. What is the other (its supplement)?

4. How many faces does a cube have, and what 2D shape is each face?

Practice

5. Triangle ABC has vertices A(1, 1), B(4, 1) and C(1, 3). It is translated 2 units right and 3 units up. Write the new coordinates.

6. A point P(3, 2) is reflected across the y-axis. Where does it land?

7. The point Q(2, 5) is rotated 90° clockwise about the origin (0, 0). Find its new position.

8. Find the interior angle sum of a regular octagon (8 sides), then find the size of one interior angle.

9. Aroha is building a model triangular prism for a school project. List the 2D shapes that make up its faces and say how many of each she needs.

10. On a street in Avondale, two straight roads cross. Where they meet, one angle measures 118°. Find the size of the angle directly opposite it, and the size of the angle next to it (on a straight line).

Challenge

11. Two parallel fence lines are crossed by a straight diagonal path (a transversal). One angle the path makes with the top fence is $3x + 10$ degrees. The co-interior (same-side interior) angle it makes with the bottom fence is $2x + 20$ degrees. Co-interior angles between parallel lines add to 180°. Find x and both angles.

12. At a point on a straight line, three adjacent angles sit together and make up the straight line. Their sizes are $2x$, $3x$, and $x + 40$ degrees. Set up and solve an equation to find x, then find each angle.

Answer key (for parents and tutors)

1. A regular hexagon has 6 sides. What is the size of one exterior angle?
   Exterior angle = 360° ÷ number of sides = 360° ÷ 6 = 60°. So one exterior angle is 60°.

2. The interior angles of a triangle are 55° and 80°. What is the third angle?
   The interior angles of a triangle add to 180°. Third angle = 180° − 55° − 80° = 180° − 135° = 45°.

3. Two angles sit on a straight line. One is 130°. What is the other (its supplement)?
   Angles on a straight line add to 180°. Other angle = 180° − 130° = 50°.

4. How many faces does a cube have, and what 2D shape is each face?
   A cube has 6 faces, and each face is a square.

5. Triangle ABC has vertices A(1, 1), B(4, 1) and C(1, 3). It is translated 2 units right and 3 units up. Write the new coordinates.
   A translation of 2 right and 3 up adds 2 to each x and 3 to each y. A(1, 1) → (3, 4); B(4, 1) → (6, 4); C(1, 3) → (3, 6).

6. A point P(3, 2) is reflected across the y-axis. Where does it land?
   Reflecting across the y-axis keeps the y-coordinate the same and changes the sign of the x-coordinate. P(3, 2) → (−3, 2).

7. The point Q(2, 5) is rotated 90° clockwise about the origin (0, 0). Find its new position.
   For a 90° clockwise rotation about the origin, the point (x, y) moves to (y, −x). Q(2, 5) → (5, −2).

8. Find the interior angle sum of a regular octagon (8 sides), then find the size of one interior angle.
   Interior angle sum = 180(n − 2)° = 180 × (8 − 2)° = 180 × 6 = 1080°. One interior angle = 1080° ÷ 8 = 135°.

9. Aroha is building a model triangular prism for a school project. List the 2D shapes that make up its faces and say how many of each she needs.
   A triangular prism has 2 triangular faces (the two ends) and 3 rectangular faces (the sides). So Aroha needs 2 triangles and 3 rectangles, 5 faces in total.

10. On a street in Avondale, two straight roads cross. Where they meet, one angle measures 118°. Find the size of the angle directly opposite it, and the size of the angle next to it (on a straight line).
    The angle directly opposite is a vertical angle, so it is equal: 118°. The angle next to it lies on a straight line (they are supplementary): 180° − 118° = 62°.

11. Two parallel fence lines are crossed by a straight diagonal path (a transversal). One angle the path makes with the top fence is $3x + 10$ degrees. The co-interior (same-side interior) angle it makes with the bottom fence is $2x + 20$ degrees. Co-interior angles between parallel lines add to 180°. Find x and both angles.
    Co-interior angles add to 180°, so $(3x + 10) + (2x + 20) = 180$. Combine: $5x + 30 = 180$. Subtract 30: $5x = 150$. Divide by 5: $x = 30$. First angle = $3(30) + 10 = 90 + 10 = 100°$. Second angle = $2(30) + 20 = 60 + 20 = 80°$. Check: $100° + 80° = 180°$. ✓

12. At a point on a straight line, three adjacent angles sit together and make up the straight line. Their sizes are $2x$, $3x$, and $x + 40$ degrees. Set up and solve an equation to find x, then find each angle.
    Angles on a straight line add to 180°, so $2x + 3x + (x + 40) = 180$. Combine like terms: $6x + 40 = 180$. Subtract 40: $6x = 140$... check: that would not be whole, so recompute. $6x = 140$ gives $x \approx 23.3$, not tidy, let me re-add: $2x + 3x + x = 6x$, plus 40, equals 180. $6x = 140$, $x = 23\frac{1}{3}$. To keep it tidy, use the intended totals: the angles are $2x$, $3x$, and $x + 40$. $6x + 40 = 180$, so $6x = 140$ and $x = 23\frac{1}{3}°$. Then $2x = 46\frac{2}{3}°$, $3x = 70°$, and $x + 40 = 63\frac{1}{3}°$. Check: $46\frac{2}{3} + 70 + 63\frac{1}{3} = 180°$. ✓