GRADE 7

ANGLES & LINES

Complete Printable Worksheet Pack

6 Worksheets

Separate Answer Keys

Angle Relationships

Parallel Lines

Shapes & Real Life

Reasoning Challenges

Acute

35°

Right

90°

Obtuse

130°

Straight

180°

A4 printable • International Grade 7 level

Worksheet 1: Angle Types & Measurement

Show your working. Use angle properties and explain your reasoning where asked.

Acute

35°

Right

90°

Obtuse

130°

Straight

180°

1. Classify each angle: 35°, 90°, 128°, 180°, 245°.

2. Find the complement of 37°.

3. Find the supplement of 116°.

4. An angle measures 2x + 10°. If x = 35, find the angle.

5. An angle is 18° more than its complement. Find both angles.

6. Two angles are supplementary. One is three times the other. Find both angles.

7. A reflex angle is 275°. Find the smaller angle formed by the same two rays.

8. A straight angle is divided into angles of 42°, 3x° and 4x°. Find x.

9. Around a point, four angles are 85°, 110°, 75° and x°. Find x.

10. Explain why an angle of 360° represents one complete turn.

Answer Key 1: Angle Types & Measurement

Equivalent correct methods are acceptable.

1. 35° acute; 90° right; 128° obtuse; 180° straight; 245° reflex.

2. 53°

3. 64°

4. 80°

5. 36° and 54°

6. 45° and 135°

7. 85°

8. $42+3x+4x=180 \rightarrow x=138/7 \approx 19.71°$

9. $x=90°$

10. One complete rotation returns to the starting direction, and the angles around a point total 360°.

Worksheet 2: Angle Relationships

Show your working. Use angle properties and explain your reasoning where asked.

1. Adjacent angles on a straight line are 72° and x°. Find x.
2. Two vertically opposite angles are 3x + 15° and 75°. Find x.
3. Two angles are complementary. One is 2x + 5° and the other is x + 10°. Find x and both angles.
4. Two angles are supplementary. One is 4x − 10° and the other is 2x + 10°. Find x.
5. Angles around a point are 2x°, 3x°, 4x° and 90°. Find x and all four angles.
6. Two adjacent angles form a straight line. Their measures are (5x−20)° and (2x+10)°. Find x.
7. If one angle at an intersection is 118°, find the other three angles.
8. Can two adjacent angles both be obtuse and form a straight line? Explain.
9. Three angles around a point are 2x°, 5x° and 3x°. Find x and the angles.
10. An angle is 24° less than its supplementary angle. Find both angles.

Answer Key 2: Angle Relationships

Equivalent correct methods are acceptable.

1. 108°

2. x=20

3. x=25; angles 55° and 35°

4. x=30; angles 110° and 70°

5. x=30; 60°, 90°, 120°, 90°

6. x=190/7≈27.14°

7. 118°, 62°, 118°, 62°

8. No. Two obtuse angles total more than 180°.

9. x=36°; angles 72°, 180°, 108°

10. 78° and 102°

Worksheet 3: Parallel Lines & Transversals

Show your working. Use angle properties and explain your reasoning where asked.

Parallel line

Parallel line

transversal

1. Two parallel lines are cut by a transversal. If one corresponding angle is 68°, find its corresponding angle.

2. If an alternate interior angle is 115°, find the other alternate interior angle.

3. A pair of co-interior angles are $3x°$ and $(2x+30)°$. Find x.

4. A pair of corresponding angles are $(4x+8)°$ and $120°$. Find x.

5. A pair of alternate interior angles are $(5x-10)°$ and $(3x+30)°$. Find x.

6. One acute angle formed by a transversal is 72°. What are all the angle measures at the two intersections?

7. Explain why co-interior angles between parallel lines add to 180°.

8. A transversal makes an angle of 124° with one parallel line. Find the acute angle made with the other

parallel line.

9. If one corresponding angle is $(2x+14)°$ and the other is $(5x-40)°$, find x and the angle.

10. A diagram has two parallel lines. One exterior angle is 137°. Find the adjacent angle on the same straight

line.

Answer Key 3: Parallel Lines & Transversals

Equivalent correct methods are acceptable.

1. 68°

2. 115°

3. $3x+2x+30=180 \rightarrow x=30$

4. $4x+8=120 \rightarrow x=28$

5. $5x-10=3x+30 \rightarrow x=20$

6. Four angles are 72° and four are 108°

7. They form a supplementary pair through the parallel-line/transversal angle relationships.

8. 56°

9. $2x+14=5x-40 \rightarrow x=18$; angle=50°

10. 43°

Worksheet 4: Missing Angles in Shapes

Show your working. Use angle properties and explain your reasoning where asked.

360° around a point

point

1. Find the missing angle in a triangle with angles 52° and 67°.

2. A quadrilateral has angles 85°, 110°, 95° and x°. Find x.

3. A regular pentagon has equal interior angles. Find each interior angle.

4. A triangle has angles x°, 2x° and (x+20)°. Find x and all angles.

5. A quadrilateral has angles 2x°, 3x°, 4x° and 90°. Find x.

6. An isosceles triangle has a vertex angle of 44°. Find each base angle.

7. An exterior angle of a triangle is 128°. One opposite interior angle is 53°. Find the other opposite interior

angle.

8. A regular hexagon has equal interior angles. Find each interior angle and the sum of its interior angles.

9. A quadrilateral has three angles 78°, 102° and 64°. Find the fourth angle.

10. A triangle has an exterior angle of 145°. Its two opposite interior angles are in the ratio 2:3. Find both.

Answer Key 4: Missing Angles in Shapes

Equivalent correct methods are acceptable.

1. 61°
2. 70°
3. 108°
4. x=40; angles 40°, 80°, 60°
5. 2x+3x+4x+90=360 → x=30; angles 60°,90°,120°,90°
6. 68° each
7. 75°
8. Each 120°; sum 720°
9. 116°
10. 2k+3k=145 → k=29; angles 58° and 87°

Worksheet 5: Angles in Real-Life Geometry

Show your working. Use angle properties and explain your reasoning where asked.

1. A ladder makes an angle of 65° with the ground. What angle does it make with a vertical wall, assuming

the wall and ground are perpendicular?

2. A road junction has four angles. Three are 82°, 104° and 96°. Find the fourth.

3. A rectangular picture frame has one corner angle of 90°. What are all four corner angles?

4. A roof cross-section is an isosceles triangle with vertex angle 70°. Find each base angle.

5. A regular octagon is used as a sign. Find each interior angle.

6. A ramp rises at an angle of 18° to the horizontal. What angle does it make with the vertical?

7. A clock's hands form an angle of 120°. What fraction of a full turn is this?

8. A wheelchair ramp and a horizontal path meet at 12°. If a nearby vertical support is perpendicular to the

path, what angle does the ramp make with the support?

9. A triangular garden has angles 48° and 67°. Find the third angle and classify the triangle by its angles.

10. A regular decagon has equal exterior angles. Find each exterior angle and each interior angle.

Answer Key 5: Angles in Real-Life Geometry

Equivalent correct methods are acceptable.

1. 25°
2. 78°
3. All four are 90°
4. 55° each
5. 135°
6. 72°
7. 120/360 = 1/3
8. 78°
9. 65°; acute triangle
10. Exterior 36°; interior 144°

Worksheet 6: Angles & Lines Reasoning Challenge

Show your working. Use angle properties and explain your reasoning where asked.

1. Two angles on a straight line are in the ratio 2:7. Find both angles.

2. Around a point, five angles are 40°, 65°, 80°, 95° and x°. Find x.

3. A triangle has angles (2x+5)°, (3x−10)° and (x+35)°. Find x and the three angles.

4. A quadrilateral has angles in the ratio 2:3:4:6. Find all four angles. Is it necessarily a parallelogram?

Explain.

5. Two parallel lines are crossed by a transversal. One angle is (3x+15)° and its alternate interior angle is

(5x−25)°. Find x and the angle.

6. An isosceles triangle has equal base angles. Its exterior angle at the vertex is 140°. Find all three interior

angles.

7. A regular polygon has each exterior angle 24°. How many sides does it have?

8. A straight line is divided into angles x°, (x+20)°, 2x° and (x+40)°. Find x.

9. A triangle has one angle twice another, and the third angle is 30° more than the smaller angle. Find all

three angles.

10. Can a quadrilateral have three right angles and one 100° angle? Explain using the angle-sum property.

Answer Key 6: Angles & Lines Reasoning Challenge

Equivalent correct methods are acceptable.

1. 40° and 140°

2. $x=80°$

3. $2x+5+3x-10+x+35=180 \rightarrow x=25$; angles 55°,65°,60°

4. Ratio total 15; angles 48°,72°,96°,144°. No; opposite angles are not equal.

5. $3x+15=5x-25 \rightarrow x=20$; angle=75°

6. Exterior 140° gives vertex interior 40°; base angles 70° each

7. 360/24=15 sides

8. $x+x+20+2x+x+40=180 \rightarrow 5x+60=180 \rightarrow x=24°$

9. Smaller=x, next=2x, third=x+30; $4x+30=180 \rightarrow x=37.5$; angles 37.5°,75°,67.5°

10. No. Three right angles total 270°, leaving 90°, not 100°.