

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°

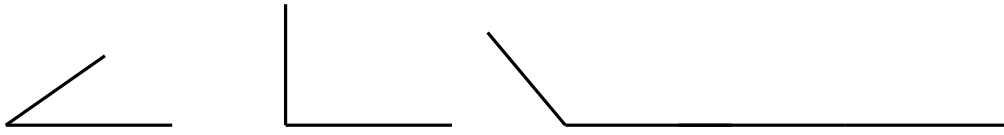
Obtuse
130°

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 $2x + 10^\circ$. 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° , $3x^\circ$ and $4x^\circ$. 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. $42+3x+4x=180 \rightarrow x=138/7 \approx 19.71^\circ$
9. $x=90^\circ$
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 $3x + 15^\circ$ and 75° . Find x .
3. Two angles are complementary. One is $2x + 5^\circ$ and the other is $x + 10^\circ$. Find x and both angles.
4. Two angles are supplementary. One is $4x - 10^\circ$ and the other is $2x + 10^\circ$. Find x .
5. Angles around a point are $2x^\circ$, $3x^\circ$, $4x^\circ$ and 90° . Find x and all four angles.
6. Two adjacent angles form a straight line. Their measures are $(5x-20)^\circ$ and $(2x+10)^\circ$. 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 $2x^\circ$, $5x^\circ$ and $3x^\circ$. Find x and the angles.
10. An angle is 24° less than its supplementary angle. Find both angles.

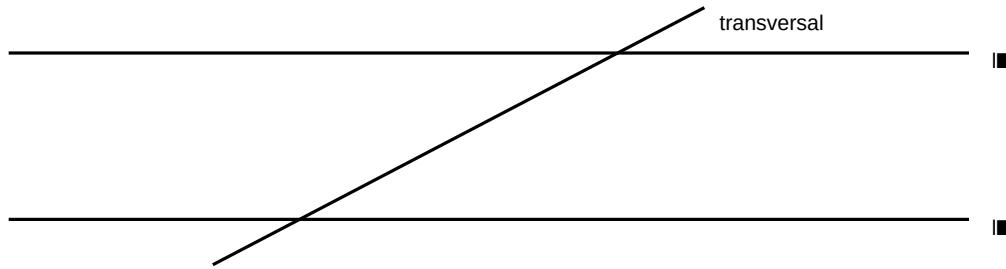
Answer Key 2: Angle Relationships

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. $x=190/7 \approx 27.14^\circ$
7. 118° , 62° , 118° , 62°
8. No. Two obtuse angles total more than 180° .
9. $x=36^\circ$; 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.



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 $3x^\circ$ and $(2x+30)^\circ$. Find x .
4. A pair of corresponding angles are $(4x+8)^\circ$ and 120° . Find x .
5. A pair of alternate interior angles are $(5x-10)^\circ$ and $(3x+30)^\circ$. 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 $(2x+14)^\circ$ and the other is $(5x-40)^\circ$, 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.

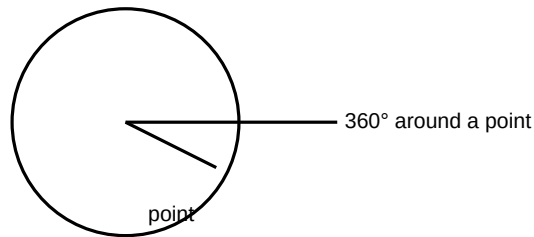
8. 56°

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.



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° , $2x^\circ$ and $(x+20)^\circ$. Find x and all angles.
5. A quadrilateral has angles $2x^\circ$, $3x^\circ$, $4x^\circ$ 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. $2x+3x+4x+90=360 \rightarrow x=30$; angles $60^\circ, 90^\circ, 120^\circ, 90^\circ$
6. 68° each
7. 75°
8. Each 120° ; sum 720°
9. 116°
10. $2k+3k=145 \rightarrow k=29$; 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 $(2x+5)^\circ$, $(3x-10)^\circ$ and $(x+35)^\circ$. 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 $(3x+15)^\circ$ and its alternate interior angle is $(5x-25)^\circ$. 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° , $(x+20)^\circ$, $2x^\circ$ and $(x+40)^\circ$. 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. $x=80^\circ$
3. $2x+5+3x-10+x+35=180 \rightarrow x=25$; angles $55^\circ, 65^\circ, 60^\circ$
4. Ratio total 15; angles $48^\circ, 72^\circ, 96^\circ, 144^\circ$. No; opposite angles are not equal.
5. $3x+15=5x-25 \rightarrow x=20$; angle $=75^\circ$
6. Exterior 140° gives vertex interior 40° ; base angles 70° each
7. $360/24=15$ sides
8. $x+x+20+2x+x+40=180 \rightarrow 5x+60=180 \rightarrow x=24^\circ$
9. Smaller $=x$, next $=2x$, third $=x+30$; $4x+30=180 \rightarrow x=37.5$; angles $37.5^\circ, 75^\circ, 67.5^\circ$
10. No. Three right angles total 270° , leaving 90° , not 100° .