

GRADE 8 MATHEMATICS

Angles & Lines

Complete Printable Worksheet Pack

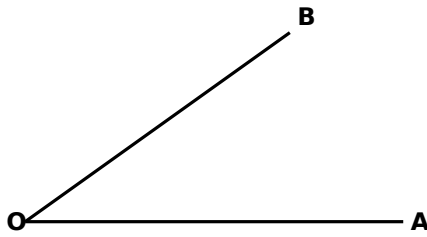
6 Practice Worksheets • 6 Answer Keys

Angle facts • Parallel lines • Triangles • Polygons • Reasoning

Name: _____ Date: _____

Worksheet 1 — Types of Angles & Angle Facts

Use the diagram where provided. Show angle calculations clearly.



1. Classify 35° as acute, right, obtuse, straight or reflex.
2. Classify 90° .
3. Classify 145° .
4. Classify 180° .
5. Classify 225° .
6. Find the complement of 37° .
7. Find the supplement of 112° .
8. Two angles are complementary. One is 58° . Find the other.
9. Two angles are supplementary. One is 73° . Find the other.
10. Challenge: An angle is 4 times its complement. Find both angles.

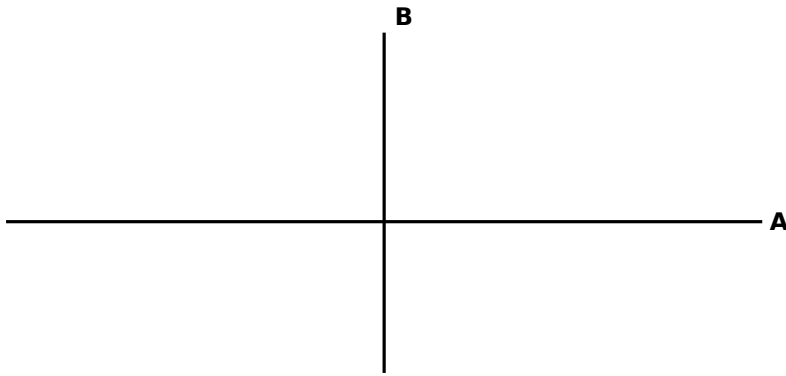
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Answer Key 1 — Types of Angles & Angle Facts

1. Acute
2. Right
3. Obtuse
4. Straight
5. Reflex
6. 53°
7. 68°
8. 32°
9. 107°
10. Angles are 72° and 18°

Worksheet 2 — Angles on Lines & Around a Point

Use the diagram where provided. Show angle calculations clearly.



1. Angles on a straight line are 68° and x° . Find x .
2. Three angles on a straight line are 45° , 72° and x° . Find x .
3. Angles around a point are 90° , 120° , 80° and x° . Find x .
4. Two vertically opposite angles are 57° . What is the angle opposite them?
5. If one angle at an intersection is 118° , find the other three angles.
6. Two adjacent angles on a straight line are $(3x + 10)^\circ$ and $(2x - 5)^\circ$. Find x .
7. Two vertically opposite angles are $(4x + 8)^\circ$ and $(6x - 22)^\circ$. Find x .
8. Four angles around a point are x° , $2x^\circ$, $3x^\circ$ and $4x^\circ$. Find x .
9. Explain why vertically opposite angles are equal.
10. Challenge: Three angles around a point are $2x^\circ$, $3x^\circ$ and $(4x + 10)^\circ$. Find x .

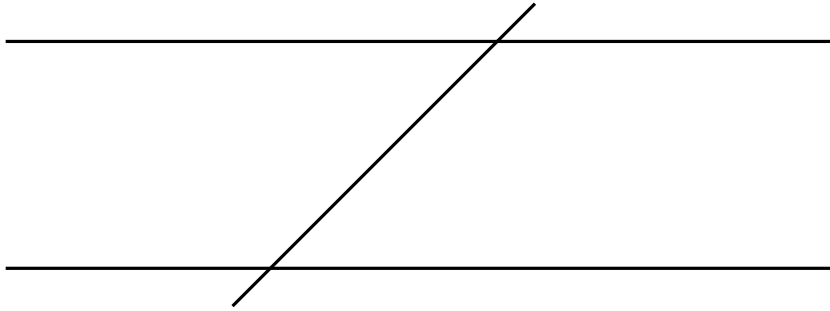
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Answer Key 2 — Angles on Lines & Around a Point

1. 112°
2. 63°
3. 70°
4. 57°
5. $118^\circ, 62^\circ, 118^\circ, 62^\circ$
6. $3x+10 + 2x-5 = 180, x=35$
7. $4x+8=6x-22, x=15$
8. $10x=360, x=36$
9. When two straight lines intersect, the opposite angles are formed by the same pair of rays in reverse order and are equal.
10. $2x+3x+4x+10=360, x=350/9 \approx 38.89^\circ$

Worksheet 3 — Parallel Lines & Transversals

Use the diagram where provided. Show angle calculations clearly.



1. When a transversal crosses parallel lines, corresponding angles are _____.
2. Alternate interior angles are _____.
3. Co-interior angles on the same side of a transversal add to _____.
4. If a corresponding angle is 72° , find the matching corresponding angle.
5. If an alternate interior angle is 115° , find its partner.
6. A co-interior angle is 68° . Find the other co-interior angle.
7. Two corresponding angles are $(3x + 10)^\circ$ and $(5x - 30)^\circ$. Find x .
8. Two co-interior angles are $(2x + 15)^\circ$ and $(4x + 9)^\circ$. Find x .
9. Explain how angle relationships can be used to determine whether two lines are parallel.
10. Challenge: An angle is 20° more than its alternate interior angle. Is this possible for parallel lines? Explain.

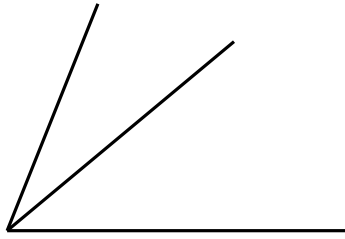
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Answer Key 3 — Parallel Lines & Transversals

1. Equal
2. Equal
3. 180°
4. 72°
5. 115°
6. 112°
7. $3x+10=5x-30$, $x=20$
8. $2x+15+4x+9=180$, $x=26$
9. If corresponding or alternate interior angles are equal, or co-interior angles sum to 180° , the lines can be shown to be parallel.
10. No. Alternate interior angles are equal when the lines are parallel.

Worksheet 4 — Angles in Triangles & Polygons

Use the diagram where provided. Show angle calculations clearly.



1. Two angles of a triangle are 48° and 67° . Find the third angle.
2. An isosceles triangle has equal angles of 52° . Find the third angle.
3. A triangle has angles x° , $(2x)^\circ$ and $(3x)^\circ$. Find x .
4. A triangle has angles $(x + 10)^\circ$, $(2x + 5)^\circ$ and $(3x - 15)^\circ$. Find x .
5. Find the interior angle sum of a pentagon.
6. Find the interior angle sum of a hexagon.
7. Find each interior angle of a regular pentagon.
8. Find each interior angle of a regular octagon.
9. A regular polygon has each exterior angle 30° . How many sides does it have?
10. Challenge: A polygon has interior angle sum 1260° . How many sides does it have?

Working space:

Answer Key 4 — Angles in Triangles & Polygons

1. 65°
2. 76°
3. $x=30^\circ$, angles $30^\circ, 60^\circ, 90^\circ$
4. $x=30^\circ$
5. 540°
6. 720°
7. 108°
8. 135°
9. 12 sides
10. $(n-2)180=1260$, $n=9$ sides

Worksheet 5 — Missing Angles & Algebraic Reasoning

Use the diagram where provided. Show angle calculations clearly.



1. Two adjacent angles on a line are $(4x + 12)^\circ$ and $(2x + 30)^\circ$. Find x .
2. Vertically opposite angles are $(7x - 5)^\circ$ and $(3x + 35)^\circ$. Find x .
3. A triangle has angles $(x + 10)^\circ$, $(x + 20)^\circ$ and $2x^\circ$. Find x .
4. A right triangle has one acute angle of 37° . Find the other acute angle.
5. An isosceles triangle has vertex angle 40° . Find each base angle.
6. A quadrilateral has angles 82° , 96° , 101° and x° . Find x .
7. A regular hexagon has one exterior angle marked x° . Find x .
8. Two parallel lines are crossed by a transversal. One angle is $(3x + 15)^\circ$ and its corresponding angle is $(5x - 25)^\circ$. Find x and the angle.
9. A student says the interior angles of a quadrilateral add to 360° because each angle is 90° . Explain why the conclusion can still be true even when the angles are not all 90° .
10. Challenge: A triangle has exterior angle 124° . One remote interior angle is 47° . Find the other remote interior angle.

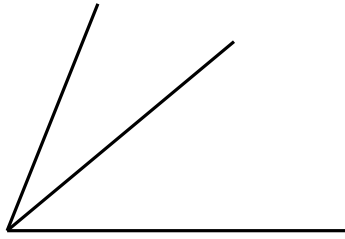
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Answer Key 5 — Missing Angles & Algebraic Reasoning

1. $x=23$
2. $x=10$
3. $x=37.5^\circ$
4. 53°
5. 70° each
6. 81°
7. 60°
8. $3x+15=5x-25$, $x=20$, angle= 75°
9. The total is always 360° for any quadrilateral; it does not require all angles to be 90° .
10. Exterior angle = sum of remote interior angles, so $124-47=77^\circ$

Worksheet 6 — Angles & Lines Challenge

Use the diagram where provided. Show angle calculations clearly.



1. Around a point are angles x° , $(2x + 10)^\circ$, $(3x - 20)^\circ$ and 70° . Find x .
2. A triangle has angles $(2x + 5)^\circ$, $(3x - 10)^\circ$ and $(4x + 5)^\circ$. Find x .
3. A regular polygon has each interior angle 150° . Find the number of sides.
4. A regular polygon has 18 sides. Find each exterior angle.
5. Two parallel lines have co-interior angles $(3x + 20)^\circ$ and $(5x - 10)^\circ$. Find x .
6. A quadrilateral has angles $(2x + 5)^\circ$, $(3x - 10)^\circ$, $(x + 25)^\circ$ and 80° . Find x .
7. A triangle has an exterior angle of 132° . Its two remote interior angles are in the ratio 5:6. Find both angles.
8. Explain why a triangle cannot have two obtuse angles.
9. A regular polygon has 15 sides. Find its interior angle sum and each interior angle.
10. Challenge: Two intersecting lines create an angle of $(4x + 12)^\circ$ and its adjacent angle is $(6x - 12)^\circ$. Find x and all four angles.

Working space:

Answer Key 6 — Angles & Lines Challenge

1. $5x+60=360$, $x=60$
2. $9x=185$, $x=185/9 \approx 20.56^\circ$
3. Exterior= 30° , so 12 sides
4. $360/18=20^\circ$
5. $3x+20+5x-10=180$, $x=21.25$
6. $6x+100=360$, $x=130/3 \approx 43.33^\circ$
7. $5k+6k=132$, $k=12$; angles 60° and 72°
8. Two obtuse angles already total more than 180° .
9. Sum = $(15-2)180 = 2340^\circ$; each interior = 156°
10. $4x+12+6x-12=180$, $x=18$; angles are 84° , 96° , 84° , 96°