Angles and Angle Relationships

Use this key to check answers and read the explanations.

1. The opening between two rays measures 124°. What type of angle is it?
   A. Obtuse
   B. Acute
   C. Right
   D. Straight
   Correct answer: A. Obtuse
   An obtuse angle is larger than 90° and smaller than 180°. The measure 124° is in that interval.

2. Two rays start at the same point and head in opposite directions along one line. What angle do they form?
   A. 270°
   B. 90°
   C. 180°
   D. 360°
   Correct answer: C. 180°
   Opposite rays form a straight angle. Turning from one to the other takes half a complete turn, or 180°.

3. Two angles are complementary. One measures 47°. What does the other measure?
   A. 47°
   B. 43°
   C. 53°
   D. 133°
   Correct answer: B. 43°
   Complementary angles add to 90°. Subtract 47° from 90° to get 43°.

4. One of two supplementary angles measures 116°. What is the other angle?
   A. 116°
   B. 54°
   C. 74°
   D. 64°
   Correct answer: D. 64°
   Supplementary angles add to 180°. The difference between 180° and 116° is 64°.

5. A rotating sign makes a clockwise turn of 290°. How many more degrees clockwise will return it to its starting orientation for the first time?

A. 20°
B. 70°
C. 110°
D. 290°

Correct answer: B. 70°
A complete turn is 360°. The sign has 70° left to turn before it completes its first rotation.

6. Two straight lines cross. One of the four angles at the intersection measures 31°. What is the measure of the angle vertically opposite it?

A. 31°
B. 59°
C. 118°
D. 149°

Correct answer: A. 31°
Vertical angles have equal measures. The angle next to the 31° angle on a straight line would measure 149°.

7. A diagonal crosses two parallel lines. The upper-right angle at one crossing measures 78°. What is the upper-right angle at the other crossing?

A. 156°
B. 12°
C. 102°
D. 78°

Correct answer: D. 78°
The angles in the same relative position are corresponding angles. They have equal measures when the crossed lines are parallel.

8. A transversal crosses two parallel lines. Two marked angles lie between the parallel lines at different crossings and on opposite sides of the transversal. What relationship do they have?

A. They are corresponding angles at the same crossing.
B. They form a linear pair and must add to 180°.
C. They are alternate interior angles and have equal measures.
D. They are vertical angles and share a vertex.

Correct answer: C. They are alternate interior angles and have equal measures.
They are both inside the band between the lines, at opposite sides of the transversal. Parallel lines make this alternate interior pair equal.

9. Two adjacent angles form a straight line. Their measures are x + 37 and 2x + 8, in degrees. How large is the larger angle?

A. 98°
B. 82°
C. 45°
D. 135°

Correct answer: A. 98°
Their sum is 180°, so 3x + 45 = 180 and x = 45. The measures are 82° and 98°.

10. A triangle’s angles at A and B measure 57° and 68°. A side is extended at C to make the exterior angle next to the interior angle at C. How large is the exterior angle?

A. 180°
B. 55°
C. 113°
D. 125°

Correct answer: D. 125°
The exterior angle equals the sum of the two nonadjacent interior angles. Add 57° and 68° to get 125°.

11. Two complementary angles are in a 2-to-3 ratio. What is the measure of the smaller one?

A. 45°
B. 30°
C. 36°
D. 54°

Correct answer: C. 36°
Five equal parts make 90°, so each part is 18°. The smaller angle takes two parts, or 36°.

12. A transversal makes a pair of same-side interior angles of 3x + 12 degrees and 2x + 3 degrees. The crossed lines are parallel. What is x?

A. 3
B. 33
C. 15
D. 39

Correct answer: B. 33
Same-side interior angles add to 180° when the lines are parallel. This gives 5x + 15 = 180, so x = 33.

13. Four adjacent angles fit exactly around a point. They measure x, 2x, 3x and 4x degrees. What is the measure of the largest angle?

A. 180°
B. 90°
C. 108°
D. 144°

Correct answer: D. 144°
The angles total 360°. Their expressions sum to 10x, so x is 36 and 4x is 144.

14. Someone traces the perimeter of a regular polygon. At every corner they turn through the same exterior angle of 24°. How many sides does the polygon have?

A. 15
B. 12
C. 18
D. 24

Correct answer: A. 15
The exterior turns add to one full turn, or 360°. Dividing 360° by the turn of 24° gives 15 sides.

15. An exterior angle at C in a triangle measures 142°. Interior angle B is 18° larger than interior angle A. What are the measures of A and B, in that order?

A. 71° and 71°
B. 80° and 62°
C. 62° and 80°
D. 52° and 70°

Correct answer: C. 62° and 80°
The two nonadjacent interior angles must sum to 142°. Subtract the 18° difference and divide 124° by two to get A = 62°. Then B = 80°.