

**All answers must be exact.** Do NOT use decimal approximations for  $\pi$ ,  $\sqrt{2}$ ,  $\sqrt{3}$ , etc. Radicals must be expressed in simplest radical form, and fractions must be expressed in lowest terms. Label answers with unit measurements, where appropriate.

1. \_\_\_\_\_ Find the degree measure of a complementary angle to a  $70^\circ$  angle.
2. \_\_\_\_\_ In an isosceles right triangle, the length of the hypotenuse is 10 cm. Find the length of a leg of the isosceles right triangle.
3. \_\_\_\_\_ A circle has an area of  $15\pi$  sq. ft. Find the circumference of the circle.
4. \_\_\_\_\_ A gardener has a rectangular garden that is 10 m by 15 m. If a concrete walkway of width 2 m is added on each side of the existing garden, how much fencing will be needed to enclose the newly constructed rectangular area consisting of the garden and the new walkway?
5. \_\_\_\_\_ The area of a trapezoid with bases of lengths 12 cm and 18 cm is 150 sq. cm. Find the length of the altitude of the trapezoid.
6. \_\_\_\_\_ In Euclidean geometry, consider two parallel lines intersected by a transversal. If an interior angle measures  $75^\circ$ , what is the degree measure of the same-side interior angle?
7. \_\_\_\_\_ What is the degree measure of the smallest angle of rotational symmetry for a regular decagon?
8. \_\_\_\_\_ If the sum of the measures of the vertex (interior) angles of a polygon is  $1260^\circ$ , how many sides does the polygon have?
9. \_\_\_\_\_; \_\_\_\_\_ The ratio of two supplementary angles is 5 to 7. What is the degree measure of each angle?
10. \_\_\_\_\_ A circle of diameter 18 cm circumscribes a regular hexagon. Find the total area outside the regular hexagon but inside the circle.
11. \_\_\_\_\_ How many lines of reflectional symmetry for a regular octagon?
12. \_\_\_\_\_ The degree measure of an angle formed by two secants of a circle that intersect outside the circle is  $52^\circ$ . If the degree measure of the smaller intercepted arc on the circle is  $30^\circ$ , find the degree measure of the larger intercepted arc on the circle.
13. \_\_\_\_\_ Two similar right triangles are related by a scale factor of  $k = 3$ . If the legs of the smaller right triangle are 5 cm and 6 cm, find the area of the larger right triangle.
14. \_\_\_\_\_ The point with coordinates (4, 1) is rotated  $180^\circ$  about the origin, then translated vertically up 5 units, and finally translated horizontally to the left 6 units. What are the coordinates of the image of this point after applying these transformations? Express your answer as an ordered pair.
15. \_\_\_\_\_; \_\_\_\_\_ A base angle of an isosceles triangle is  $63^\circ$ . Find the degree measures of the other two vertex angles of this isosceles triangle.
16. \_\_\_\_\_ The segments  $\overline{AB}$  and  $\overline{CD}$  are chords of a circle, and they intersect at point  $P$  in the interior of the circle. Find the measure of  $\overline{CP}$  if the measures of  $\overline{AP}$ ,  $\overline{BP}$ , and  $\overline{DP}$  are 20 cm, 6 cm, and 8 cm, respectively.
17. \_\_\_\_\_ What is the degree measure of an exterior angle of a regular 11-gon?
18. \_\_\_\_\_ Find the area of a kite with diagonals of lengths 16 m and 10 m.