SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.
1) A surveyor is measuring the distance across a small lake. He has set up his transit on one side of the lake 150 feet from a piling that is directly across from a pier on the other side of the lake. From his transit, the angle between the piling and the pier is 40°. What is the distance between the piling and the pier to the nearest foot?

Solve the triangle.
2) \( A = 60°, B = 100°, a = 1 \)

Two sides and an angle are given. Determine whether the given information results in one triangle, two triangles, or no triangle at all. Solve any triangle(s) that results.
3) \( B = 17°, b = 11.8, a = 20.18 \)

Solve the problem.
4) A surveyor standing 58 meters from the base of a building measures the angle to the top of the building and finds it to be 38°. The surveyor then measures the angle to the top of the radio tower on the building and finds that it is 50°. How tall is the radio tower?

Solve the triangle.
5) \( a = 9, b = 9, c = 6 \)

The rectangular coordinates of a point are given. Find polar coordinates for the point.
6) \((0, -4)\)

Transform the polar equation to an equation in rectangular coordinates. Then identify and graph the equation.
7) \( r = 2 \sin \theta \)

Find the unit vector having the same direction as \( v \).
8) \( v = -3j \)

Write the complex number in polar form. Express the argument in degrees, rounded to the nearest tenth, if necessary.
9) \( 2 + 2i \)
The letters x and y represent rectangular coordinates. Write the equation using polar coordinates (r, θ).

10) xy = 1

Determine whether the equation defines y as a function of x.

11) \( y^2 + x = 9 \)

Find the dot product \( v \cdot w \).

12) \( v = -11i + 9j, \quad w = 9i - 7j \)

Find the angle between \( v \) and \( w \). Round your answer to one decimal place, if necessary.

13) \( v = 7i + 6j, \quad w = 7i - 7j \)

Solve the problem.

14) \( \|v\| = 13, \quad \alpha = 45^\circ \)

The vector \( v \) has initial point \( P \) and terminal point \( Q \). Write \( v \) in the form \( ai + bj \); that is, find its position vector.

15) \( P = (3, 3); \quad Q = (-2, -5) \)

Write the expression in the standard form \( a + bi \).

16) \((-\sqrt{3} + i)^6\)

The polar coordinates of a point are given. Find the rectangular coordinates of the point.

17) \( (9, \pi/4) \)

Find the area of the triangle. If necessary, round the answer to two decimal places.

18) \( \triangle \)

Find and simplify the difference quotient of \( f \), \( \frac{f(x + h) - f(x)}{h} \), \( h \neq 0 \), for the function.

19) \( f(x) = 6x + 4 \)
The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

20) (-3, -4)

![Graph of a function](image)

Determine algebraically whether the function is even, odd, or neither.

21) \( f(x) = -5x^2 - 4 \)

![Graph of a function](image)

For the given functions \( f \) and \( g \), find the requested function and state its domain.

22) \( f(x) = \frac{2x - 1}{2x - 1}; \quad g(x) = \frac{7x}{2x - 1} \)

Find \( f - g \).

Find the domain of the function.

23) \( g(x) = \frac{2x}{x^2 - 9} \)

The graph of a function \( f \) is given. Use the graph to answer the question.

24) Find the numbers, if any, at which \( f \) has a local minimum. What are the local minima?

![Graph of a function](image)
Graph the function.

25) \( f(x) = \begin{cases} 
  x + 3 & \text{if } -8 \leq x < 4 \\
  -9 & \text{if } x = 4 \\
  -x + 7 & \text{if } x > 4 
\end{cases} \)

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. Determine where the function is increasing and where it is decreasing. If necessary, round answers to two decimal places.

26) \( f(x) = x^3 - 3x^2 + 3 \), \((-2, 2)\)

Solve the problem.

27) Two points A and B are on opposite sides of a building. A surveyor selects a third point C to place a transit. Point C is 53 feet from point A and 70 feet from point B. The angle ACB is 51°. How far apart are points A and B?