NOTE: You must show your work to receive full credit. Simply stating the answer will not suffice.

Give the domain and range of the relation.
1) {(-4, 18), (-3, 11), (0, 2), (3, 11), (5, 27)}

Determine whether the equation defines y as a function of x.
2) $x^2 + y^2 = 1$

Evaluate the function at the given value of the independent variable and simplify.
3) $f(x) = \frac{x^3 + 7}{x^2 - 2}$; $f(-2)$

Use the vertical line test to determine whether or not the graph is a graph in which y is a function of x.
4) 

![Graph](image-url)
Identify the intervals where the function is changing as requested.

5) Increasing

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

6) Find the numbers, if any, at which \( f \) has a relative maximum. What are the relative maxima?

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

7) \( f(x) = x^4 - x^3 \)
Use possible symmetry to determine whether the graph is the graph of an even function, an odd function, or a function that is neither even nor odd.

8)

Evaluate the piecewise function at the given value of the independent variable.

10) \( f(x) = \begin{cases} 3x + 1 & \text{if } x < -1 \\ -2x - 5 & \text{if } x \geq -1 \end{cases} \); \( f(2) \)

Find the slope of the line that goes through the given points.

11) \((3, -5), (-9, -8)\)
Determine the slope and the y-intercept of the graph of the equation.
12) \(7x - 10y - 70 = 0\)

Find the average rate of change of the function from \(x_1\) to \(x_2\).
13) \(f(x) = -3x^2 - x\) from \(x_1 = 5\) to \(x_2 = 6\)

Begin by graphing the standard quadratic function \(f(x) = x^2\). Then use transformations of this graph to graph the given function.
14) \(h(x) = (x - 7)^2 - 5\)

Find the domain of the function.
15) \(\frac{x}{\sqrt{x} - 9}\)

Given functions \(f\) and \(g\), determine the domain of \(f + g\).
16) \(f(x) = 3x + 10,\ \ g(x) = 5x + 5\)

For the given functions \(f\) and \(g\), find the indicated composition.
17) \(f(x) = \frac{x - 5}{7},\ \ g(x) = 7x + 5\)
\((g \circ f)(x)\)
Determine which two functions are inverses of each other.

18) \( f(x) = \frac{x - 2}{3} \quad g(x) = 3x - 2 \quad h(x) = \frac{x + 2}{3} \)

Find the inverse of the one-to-one function.

19) \( f(x) = -4x + 5 \)

Does the graph represent a function that has an inverse function?

20)

21)
1) domain: \(-4, -3, 0, 3, 5\); range: \(\{18, 11, 2, 27\}\)

2) \(y\) is not a function of \(x\)

3) \(-\frac{1}{2}\)

4) not a function

5) \((3, \infty)\)

6) \(f\) has a relative maximum at \(x = 0\); the relative maximum is 3

7) Neither

8) Even

9) Neither

10) \(-9\)

11) \(\frac{1}{4}\)

12) \(m = \frac{7}{10}, (0, -7)\)

13) \(-34\)

14)

15) \((9, \infty)\)

16) \((-\infty, \infty)\)

17) \(x\)

18) \(g(x)\) and \(h(x)\)

19) \(f^{-1}(x) = \frac{x - 5}{-4}\)

20) No

21) Yes