Graph f by hand by first plotting points to determine the shape of the graph.

1) \( f(x) = \frac{1}{3}x + 2 \)

Graph the absolute value function \( f(x) = |x| \) then use transformations of this graph to graph the given function. Describe the transformations in words.

2) Graph \( f(x) = |x| \) and \( f(x) = -|x + 6| \)

Sketch the graph of the rational function.

3) \( f(x) = \frac{x - 3}{x + 4} \)
Graph the function as a solid curve and its inverse as a dashed curve.

4) \( f(x) = \sqrt{x + 5} \)

Write the equation as \( f(x) = a(x - h)^2 + k \). Identify the vertex and axis of symmetry.

5) \( f(x) = x^2 + 6x - 4 \)

Solve the absolute value equation algebraically.

6) \( |4m + 7| = 9 \)

Solve by completing the square.

7) \( x^2 + 4x = 3 \)

Solve the equation.

8) \( 2x^{1/3} - 7 = 3 \)

9) \( \sqrt{4x - 3} = 2x - 3 \)

Solve the equation by the method of your choice.

10) \( 1 + \frac{1}{x} = \frac{6}{x^2} \)

11) \( 6x^2 + 12x = -2 \)
Solve the logarithmic equation symbolically.
12) \( 102 + 4 \log x = 70 \)          
12) ____________

Use common or natural logarithms to solve the exponential equation symbolically.
13) \( 3(x - 1) = 15 \)               
13) ____________

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Students will demonstrate the use of function notation and perform operations on functions.

Evaluate.
14) Given \( f(x) = -5x^2 - 4x - 2 \), find \( f(2) \).
   A) \(-26\)          B) \(-30\)          C) \(-20\)          D) \(-28\) 
14) ____________

Find the domain of \( f \).
15) \( f(x) = \frac{(x - 6)(x + 4)}{x^2 - 4} \)
   A) All real numbers          B) \( \{ x \mid x \neq -6, x \neq 4 \} \)
   C) \( \{ x \mid x \neq 6, x \neq -4 \} \)          D) \( \{ x \mid x \neq \pm 2 \} \) 
15) ____________

Complete numerical representations for the functions \( f \) and \( g \) are given. Evaluate the expression, if possible.
16) \((f \circ g)(4)\)          
16) ____________

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<td>( f(x) )</td>
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<th>( x )</th>
<th>5</th>
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<tbody>
<tr>
<td>( g(x) )</td>
<td>1</td>
<td>(-2)</td>
<td>(-1)</td>
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A) Undefined          B) 6          C) 8          D) 0 

Give the domain of the function.
17) \( f(x) = \sqrt{10 - x} \)
   A) \( x \neq 10 \)          B) \( x > \sqrt{10} \)          C) \( x \leq 10 \)          D) \( x > 0 \) 
17) ____________

Find the domain of \( f \) and write it in interval notation.
18) \( f(x) = \log_b(3x + 4) \)
18) ____________

Find the composition.
19) If \( f(x) = x^3 - 3x \) and \( g(x) = 2x \), find \((f \circ g)(x)\)
   A) \( 2x^3 - 3x \)          B) \( 8x^3 - 6x \)          C) \( 2x^3 - 6x \)          D) \( 8x^2 - 6x \) 
19) ____________
Evaluate as instructed.

20) Evaluate \((f \circ g)(3)\).

\[ y \]
\[ f(x) \]
\[ g(x) \]

A) 0  B) -1  C) 3  D) 1

Find a symbolic representation for \(f^{-1}(x)\).

21) \(f(x) = 2x - 7\)

Find the indicated composite for the pair of functions.

22) Given \(f(x) = \frac{4}{x-6}\) and \(g(x) = \frac{3}{5x}\) find \((f \circ g)(x)\).

Use the graph to evaluate the expression.

23) \((g \circ f)(4)\)

Find \(C\) and \(a\) so that \(f(x) = Ca^x\) satisfies the given conditions.

24) \(f(-1) = \frac{1}{9}\) and \(f(1) = 9\)
Solve the problem.

25) Your company uses the quadratic model \( y = -11x^2 + 350x \) to represent how many units (y) of a new product will be sold (x) weeks after its release. How many units can you expect to sell in week 12?

26) A certain radioactive isotope has a half-life of approximately 1750 years. How many years to the nearest year would be required for a given amount of this isotope to decay to 55% of that amount?

27) The position of an object moving in a straight line is given by \( s = 2t^2 - 3t \), where s is in meters and t is the time in seconds the object has been in motion. How long (to the nearest tenth) will it take the object to move 11 meters?

28) Coyotes are one of the few species of North American animals with an expanding range. The future population of coyotes in a region of Mississippi can be modeled by the equation \( P = 40 + 18 \ln(12t + 1) \), where t is time in years since 1980. Solve the equation algebraically to determine when the population will reach 170.