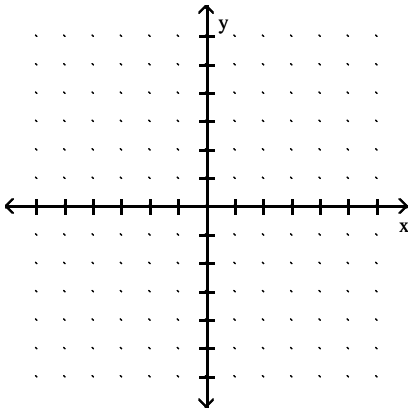
MATH 110 College Algebra MATH 1114 Core Competency #1 Sample Assessment Questions

Students will graph functions

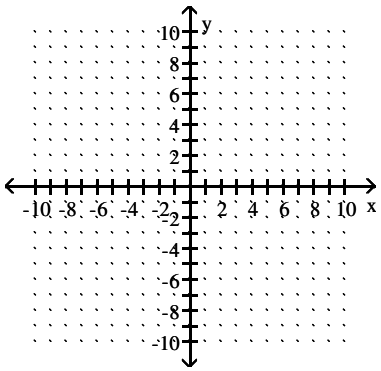
Graph f by hand by first plotting points to determine the shape of the graph.

1) $f(x) = \frac{1}{5}x + 2$ 1) _____



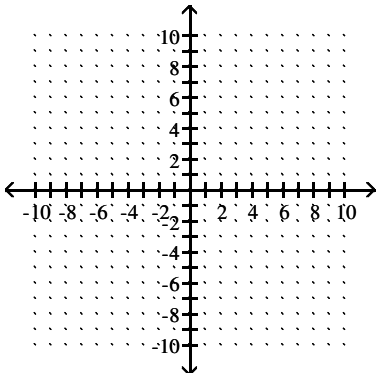
Graph the absolute value function $f(x) = |x|$ then use transformations of this graph to graph the given function. Describe the transformations in words.

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



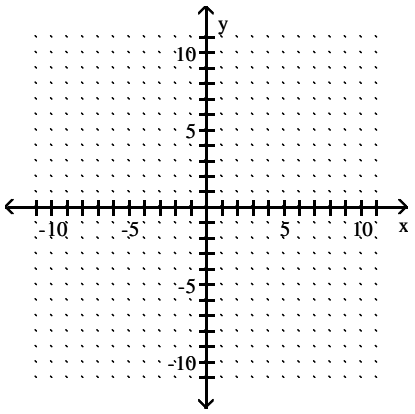
Sketch the graph of the rational function.

3) $f(x) = \frac{x - 3}{x + 4}$ 3) _____



Graph the function as a solid curve and its inverse as a dashed curve.

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



Students will solve various kinds of equations.

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

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

Solve the absolute value equation algebraically.

6) $|4m + 7| = 9$ 6) _____

Solve by completing the square.

7) $x^2 + 4x = 3$ 7) _____

Solve the equation.

8) $2x^{1/3} - 7 = 3$ 8) _____

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

Solve the equation by the method of your choice.

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

11) $6x^2 + 12x = -2$ 11) _____

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) _____

MATH 110 College Algebra MATH 1114 Core Competency #3 Sample Assessment Questions

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). 14) _____

A) –26 B) –30 C) –20 D) –28

Find the domain of f.

15) $f(x) = \dfrac{(x-6)(x+4)}{x^2-4}$ 15) _____

A) All real numbers B) $\{x \mid x \neq -6, x \neq 4\}$

C) $\{x \mid x \neq 6, x \neq -4\}$ D) $\{x \mid x \neq \pm 2\}$

Complete numerical representations for the functions f and g are given. Evaluate the expression, if possible.

16) $(f \circ g)(4)$ 16) _____

x	1	6	8	12
f(x)	–2	8	0	12

x	–5	–2	1	4
g(x)	1	–7	6	8

A) Undefined B) 6 C) 8 D) 0

Give the domain of the function.

17) $f(x) = \sqrt{10 - x}$ 17) _____

A) $x \neq 10$ B) $x > \sqrt{10}$ C) $x \leq 10$ D) $x > 0$

Find the domain of f and write it in interval notation.

18) $f(x) = \log_9(3x + 4)$ 18) _____

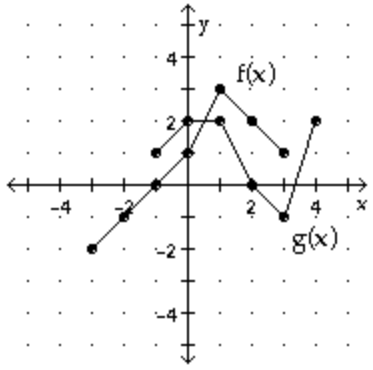
Find the composition.

19) If $f(x) = x^3 - 3x$ and $g(x) = 2x$, find $(f \circ g)(x)$ 19) _____

A) $2x^3 - 3x$ B) $8x^3 - 6x$ C) $2x^3 - 6x$ D) $8x^2 - 6x$

Evaluate as instructed.

20) Evaluate (f+g)(3). 20) _____



A) 0 B) –1 C) 3 D) 1

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

21) $f(x) = 2x - 7$ 21) _____

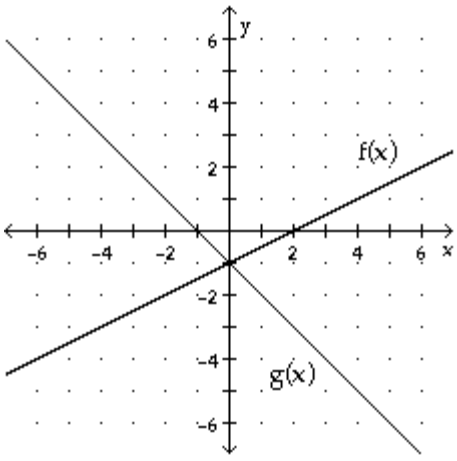
Find the indicated composite for the pair of functions.

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

Use the graph to evaluate the expression.

23) 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 $f(1) = 9$ 24) _____

Students will model/solve real-world problems.

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? 25) _____

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? 26) _____

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? 27) _____

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. 28) _____