MAC 1105 Module Test 5

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the requested value.

1) $f(6)$ for $f(x) = \begin{cases} 3x + 1 & \text{if } x < 1 \\ 6x & \text{if } 6 \le x \le 9 \\ 6 - 6x & \text{if } x > 9 \end{cases}$

A) 36 B) 55 C) 4 D) –30

Answer: A

Objective: (2.3) Evaluate Piecewise–Defined Function

Find the function value.

2) For $f(x) = -|x + 5|$, find $f(1)$.

A) 1 B) –6 C) 6 D) –5

Answer: B

Objective: (2.3) Evaluate Absolute Value/Rational Function

Solve the problem.

3) If the average cost per unit C(x) to produce x units of plywood is given by $C(x) = \frac{300}{x + 10}$, what is the unit cost for 20 units?

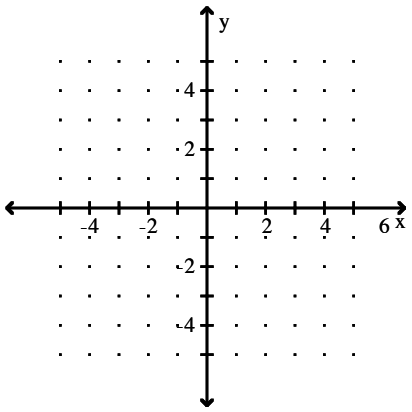
A) \$10.00 B) \$1.50 C) \$5.00 D) \$15.00

Answer: A

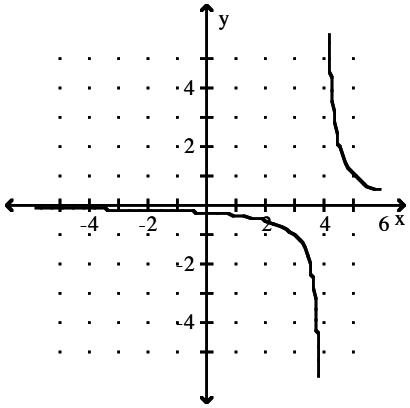
Objective: (2.3) Solve Apps: Reciprocal Functions

Graph.

4) $f(x) = \frac{1}{x} - 4$



A)



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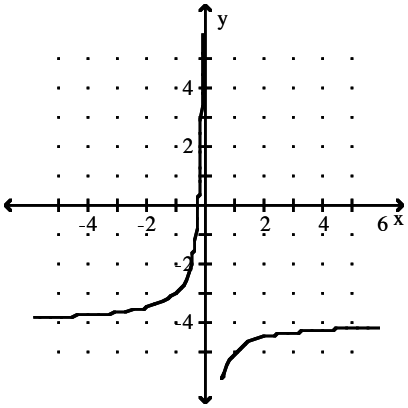

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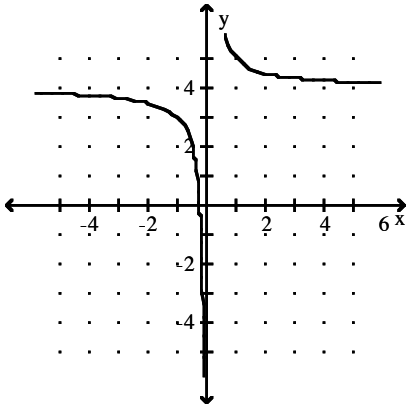

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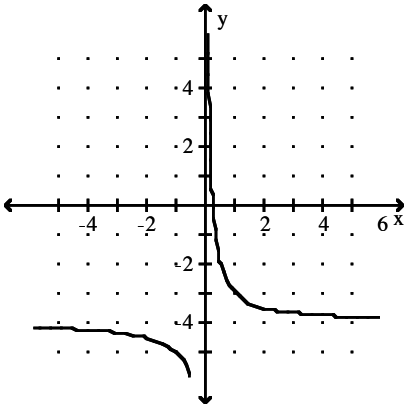


Answer: D
Objective: (2.3) Graph Reciprocal/Power/Root Function

For the given function, find the indicated function value.

5) For $f(x) = \sqrt[3]{x + 1}$, find f(–28).

A) –4
B) 3
C) –3
D) Does not exist as a real number

Answer: C
Objective: (2.3) Evaluate Root or Power Function

Solve the problem.

6) A salesperson gets a commission of $1000 for the first $10,000 of sales, and then $500 for each additional $10,000 or partial of sales. Let S(x) represent the commission on x dollars of sales. Find the value of S(75,000).

A) $3750
B) $4250
C) $4750
D) $4500

Answer: D
Objective: (2.3) Solve Apps: Piecewise–Defined Functions

Determine if the function is concave up or concave down in the first quadrant.

7) $y = x^{3/7}$

A) Concave down
B) Concave up

Answer: A
Objective: (2.3) Determine if Function Is Concave Up or Down From Equation

Solve the problem.

8) The number of people present at a stadium holding a big rock concert can be estimated with the following function:

$$y = 13252x^{0.76} + 0.41x + 102,$$

where y is the number of people present and x is the amount of time after 3:00 P.M. on the day of the concert. Predict the number of people present at 7:00PM.

A) 40,390 people B) 58,256 people C) 38,110 people D) 38,109 people

Answer: D

Objective: (2.3) Solve Apps: Power/Root Functions

9) Suppose a cost–benefit model is given by $y = \frac{5.7x}{100 - x}$, where y is the cost in thousands of dollars for removing x percent of a given pollutant. Find the cost of removing 95% to the nearest dollar.

A) \$108,300 B) \$5415 C) \$5700 D) \$19,000

Answer: A

Objective: (2.3) Solve Apps: Reciprocal Functions

10) In Country X, the average hourly wage in dollars from 1945 to 1995 can be modeled by

$$f(x) = \begin{cases} 0.078(x - 1945) + 0.33 & \text{if } 1945 \le x < 1970 \\ 0.187(x - 1970) + 3.04 & \text{if } 1970 \le x \le 1995 \end{cases}$$

Use f to estimate the average hourly wages in 1950, 1970, and 1990.

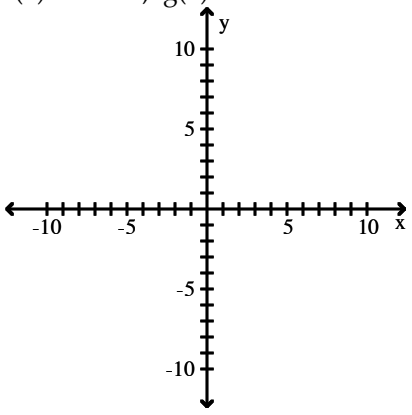
A) \$0.72, \$2.28, \$6.78 B) \$0.72, \$3.04, \$6.78 C) \$3.43, \$0.33, \$6.78

Answer: B

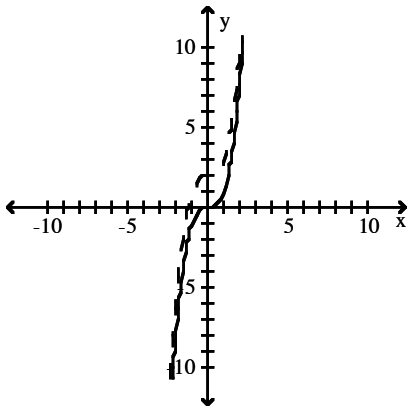
Objective: (2.3) Solve Apps: Piecewise–Defined Functions

Sketch the graph of the pair of functions. Use a dashed line for g(x).

11) $f(x) = \sqrt[3]{x}$, $g(x) = \sqrt[3]{x} + 2$



A)



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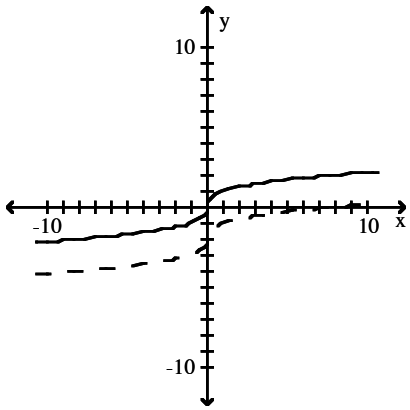

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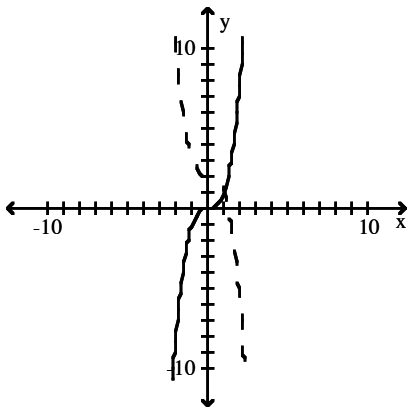
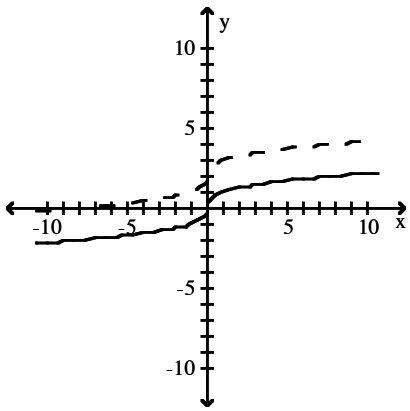


D)



Answer: D
Objective: (2.4) Graph Equation and Transformed Equation I

Write the equation of the graph after the indicated transformation(s).

12) The graph of $y = \sqrt{x}$ is shifted 2 units to the left. Then the graph is shifted 3 units upward.

A) $y = \sqrt{x + 3} + 2$ B) $y = 3\sqrt{x + 2}$ C) $y = \sqrt{x + 2} + 3$ D) $y = \sqrt{x - 2} + 3$

Answer: C
Objective: (2.4) Find Equation for Described Transformation

Solve the problem.

13) The linear equation $y = 461x + 3420$ provides an approximation of the annual cost (in dollars) of health insurance for a family of three, where $x = 1$ represents 1988, $x = 2$ represents 1989, and so on. Write an equation that yields the same y–values when the exact year number is entered.

A) $y = 461(1988 - x) + 3420$ B) $y = 461(x - 1988) + 3420$
C) $y = 461(1987 - x) + 3420$ D) $y = 461(x - 1987) + 3420$

Answer: D
Objective: (2.4) Solve Apps: Write Equation Involving Shift

Fill in each blank with the appropriate response.

14) The graph of $y = -\frac{1}{5}(x + 4)^2 - 8$ can be obtained from the graph of $y = x^2$ by shifting horizontally ___ units to the _____ , vertically shrinking by a factor of ___ , reflecting across the __–axis, and shifting vertically ___ units in the _____ direction.

A) 4; right; $\frac{1}{5}$; x; 8; upward

B) 4; left; $\frac{1}{5}$; x; 8; downward

C) 4; left; 8; x; $\frac{1}{5}$; downward

D) 4; right; $\frac{1}{5}$; x; 8; downward

Answer: B
Objective: (2.4) Describe Transformation Given Equation

Write the equation of the graph after the indicated transformation(s).

15) The graph of $y = x^2$ is shifted 5 units to the left and 8 units downward.

A) $y = (x + 5)^2 - 8$ B) $y = (x + 8)^2 - 5$ C) $y = (x - 8)^2 + 5$ D) $y = (x - 5)^2 - 8$

Answer: A
Objective: (2.4) Find Equation for Described Transformation

Fill in each blank with the appropriate response.

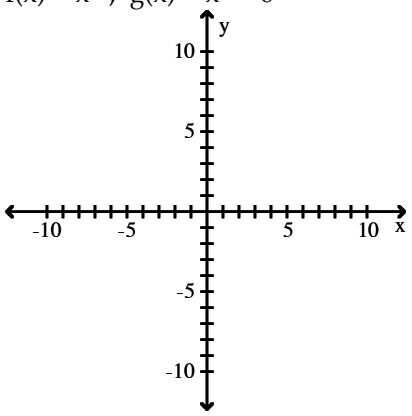
16) The graph of $y = -6x^2$ can be obtained from the graph of $y = x^2$ by vertically stretching by a factor of ___ and reflecting across the __–axis.

A) –6; y B) 6; y C) 6; x D) –6; x

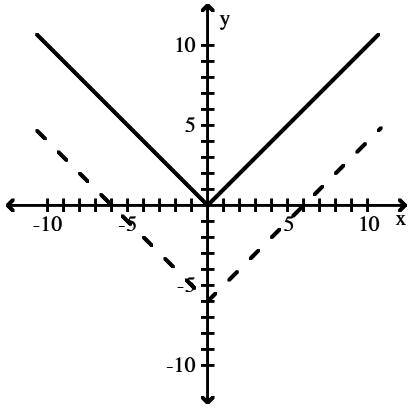
Answer: C
Objective: (2.4) Describe Transformation Given Equation

Sketch the graph of the pair of functions. Use a dashed line for g(x).

17) $f(x) = x^2$, $g(x) = x^2 - 6$



A)



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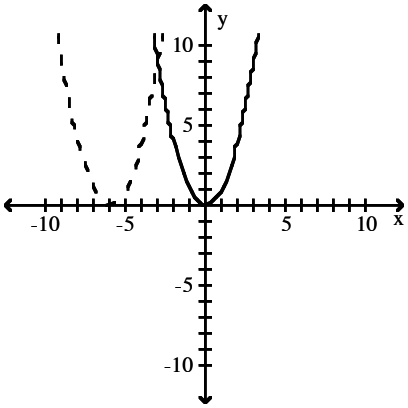

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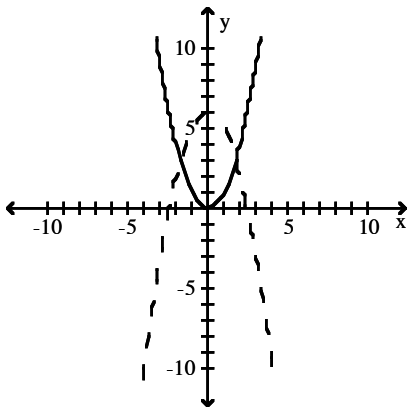
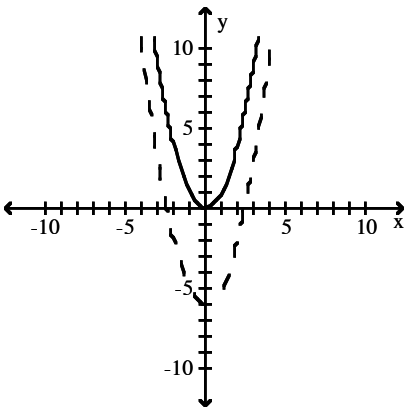


D)



Answer: D
Objective: (2.4) Graph Equation and Transformed Equation I

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

18) $f(x) = 3x^2 - 1$

A) Odd B) Even C) Neither

Answer: B
Objective: (2.4) Determine if Function Is Odd or Even

Fill in each blank with the appropriate response.

19) The graph of $y = -5(x + 4)2 - 8$ can be obtained from the graph of $y = x2$ by shifting horizontally ___ units to the _____ , vertically stretching by a factor of ___ , reflecting across the __-axis, and shifting vertically ___ units in the _____ direction.

A) 4; right; 5; x; 8; upward
B) 4; left; 8; x; 5; downward
C) 4; left; 5; x; 8; downward
D) 4; right; 5; x; 8; downward

Answer: C
Objective: (2.4) Describe Transformation Given Equation

Solve the problem.

20) The price per unit of a product is \$p and the number of units of the product is denoted by q. The demand function for this commodity is given by $p = \frac{30{,}000}{q} - 60$.

Describe the transformations needed to obtain the graph of this function from the graph of $p = \frac{1}{q}$.

A) Shift up 30,000 units and shift 60 units to the right.
B) Stretch vertically by a factor of 30,000 and shift down 60 units.
C) Stretch vertically by a factor of 30,000, reflect across the x–axis, and shift down 60 units.
D) Stretch vertically by a factor of 30,000 and shift 60 units to the right.

Answer: B
Objective: (2.4) Solve Apps: Transformations