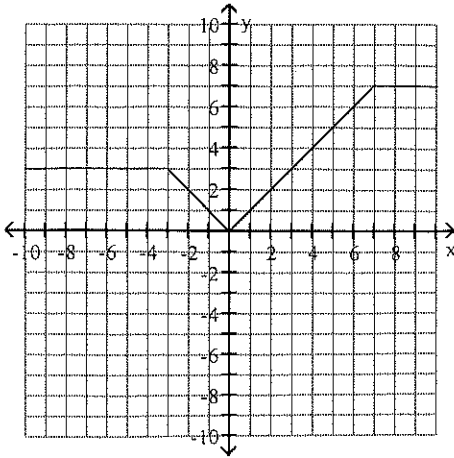


Chapter 1 Examples 2017

Name Have

Example 1: Use the graph to identify important characteristics.

1)



1) _____

$D: (-\infty, \infty)$
 $R: [0, 7)$

Examples 2-4: Determine whether the given function is even, odd, or neither.

2) $f(x) = 3x^3 + x^2 - 4$ $f(-x) = 3(-x)^3 + (-x)^2 - 4$
 $-3x^3 + x^2 - 4$

if
 $f(x) = f(-x)$ Even
 $f(x) = -f(x)$ odd

Neither

3) $f(x) = 4x^2 + x^4$
 $f(-x) = 4(-x)^2 + (-x)^4$
 $= 4x^2 + x^4$

3) Even

4) $f(x) = -2x^5 + x^3$
 $f(-x) = -2(-x)^5 + (-x)^3$
 $= 2x^5 - x^3$

4) odd

Example 5: Evaluate the piecewise function at the given value of the independent variable.

5) $f(x) = \begin{cases} 5x - 3 & \text{if } x < -4 \\ 3x - 5 & \text{if } x \geq -4 \end{cases}$ $f(-3)$

5) -14

$f(-3) = 3(-3) - 5$
 $= -9 - 5 = -14$

Example 6: Find and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$, $h \neq 0$ for the given function.

6) $f(x) = x^2 + 9x - 7$

6) $2x + h + 9$

$f(x+h) = (x+h)^2 + 9(x+h) - 7$

$x^2 + 2hx + h^2 + 9x + 9h - 7$

$\frac{f(x+h) - f(x)}{h} = \frac{x^2 + 2hx + h^2 + 9x + 9h - 7 - (x^2 + 9x - 7)}{h}$

$= \frac{2hx + h^2 + 9h}{h} = \frac{h(2x + h + 9)}{h} = \boxed{2x + h + 9}$

Example 11: For the given functions f and g , find the indicated composition.

11) $f(x) = -4x + 8$, $g(x) = 3x + 5$
 $(g \circ f)(x)$

11) _____

$$\begin{aligned} (g \circ f)(x) &= 3(-4x + 8) + 5 \\ &= -12x + 24 + 5 \\ &= \boxed{-12x + 29} \end{aligned}$$

Example 12: Find the inverse of the one-to-one function.

12) $f(x) = \frac{5}{7x-8} (7y-8)x = \frac{5}{7y-8} (7y-8)$

12) _____

$$\frac{(7y-8)x}{x} = \frac{5}{x}$$

$$\frac{7y}{7} = \frac{5}{x} + \frac{8}{7}$$

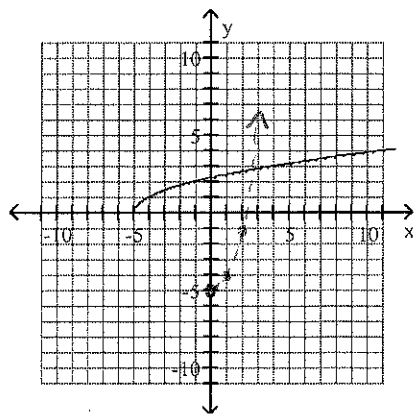
$$\boxed{y = \frac{5}{7x} + \frac{8}{7}}$$

$$7y - 8 = \frac{5}{x} + 8$$

Example 13: Use the graph of f to draw the graph of its inverse function.

13)

13) _____



	y
-5	0
-4	1
-1	2

Inverse

x	y
0	-5
1	-4
2	-1

Example 14: Determine which two functions are inverses of each other.

14) $f(x) = 3x$, $g(x) = \frac{x}{3}$, $h(x) = \frac{3}{x}$

14) $f(x)$ & $g(x)$

$$\frac{x}{3} = \frac{3y}{3}$$

$$y \cdot x = \frac{3}{y} \cdot y$$

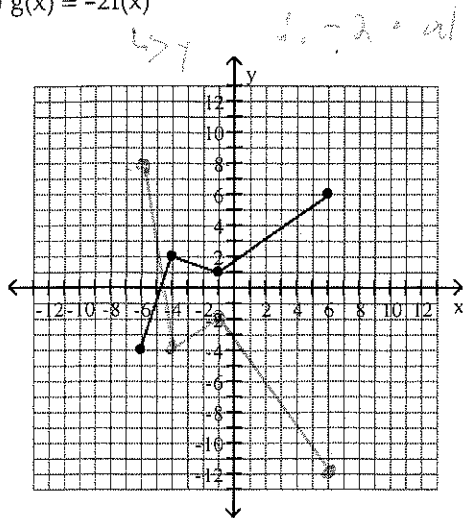
$$y^{-1} = \frac{x}{3}$$

$$f(x) = \frac{3}{x}$$

Example 19: Use the graph of $y = f(x)$ to graph the given function g .

19) $g(x) = -2f(x)$

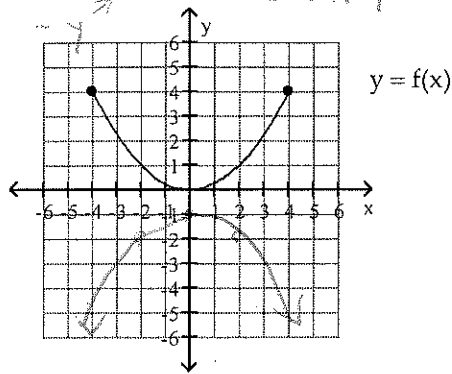
19) _____



Example 20: Use the graph of the function f , plotted with a solid line, to sketch the graph of the given function g .

20) $g(x) = -f(x) - 1$ $\leftarrow \text{down } 1$

20) _____

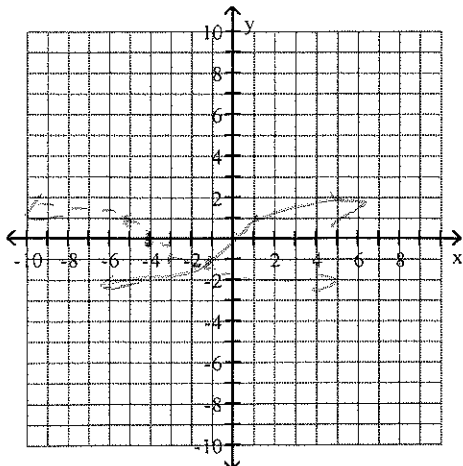


Example 21: Begin by graphing the cube root function $f(x) = \sqrt[3]{x}$. Then use transformations of this graph to graph the given function.

21) $g(x) = -\sqrt[3]{x+4} - 8$ $(-4; 0)$

$-a \sqrt[3]{x+h+k}$

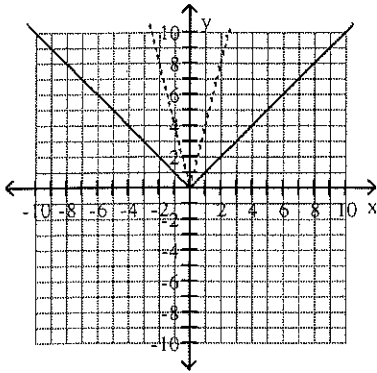
21) _____



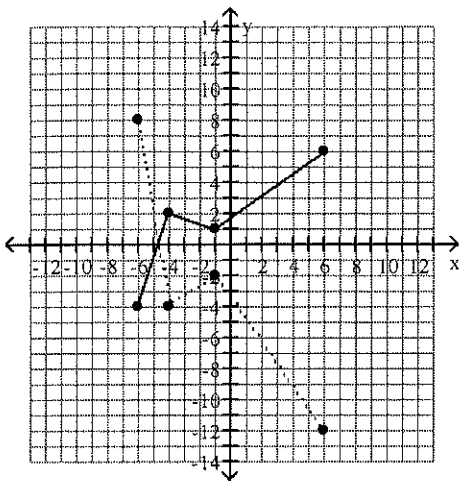
Answer Key

Testname: CHAPTER 1 EXAMPLES

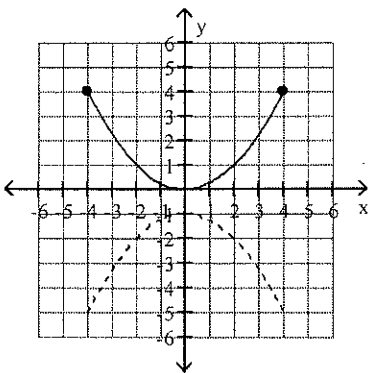
18)



19)



20)



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

Determine whether the relation is a function.

- 1) $\{(-9, -7), (-9, 5), (1, 2), (5, -2), (10, -2)\}$
A) Function

B) Not a function

1) B

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

- 2) $x^2 + y^2 = 25$
A) y is a function of x

B) y is not a function of x

2) B

- 3) $y = -\sqrt{x+1}$
A) y is a function of x

B) y is not a function of x

3) A

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

Evaluate the function at the given value of the independent variable and simplify.

4) $f(x) = 3x^2 + 2x - 3$; $f(x-1)$

$$\begin{aligned} & 3(x-1)^2 + 2(x-1) - 3 \\ & 3(x^2 - 2x + 1) + 2x - 2 - 3 \\ & 3x^2 - 6x + 3 + 2x - 5 \end{aligned}$$

4) $3x^2 - 4x - 2$

5) $f(x) = \frac{x^3 + 8}{x^2 - 8}$; $f(2)$

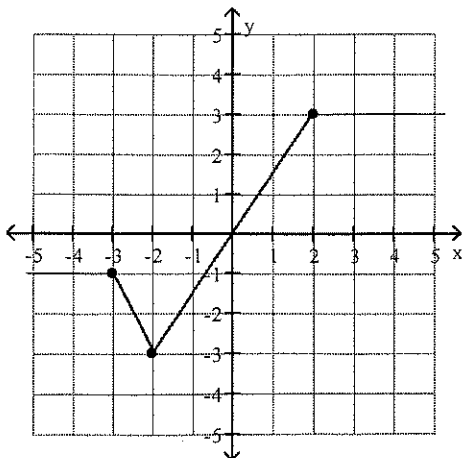
$$\frac{(2)^3 + 8}{(2)^2 - 8} = \frac{8 + 8}{4 - 8} = \frac{16}{-4} = -4$$

5) -4

Identify the intervals where the function is changing as requested.

- 6) Increasing

6) $(-2, 2)$



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

$$11) f(x) = \begin{cases} x+5 & \text{if } x > 1 \\ -(x+5) & \text{if } x \leq 1 \end{cases}; f(-3)$$

$$-(-3+5)$$

11) -2

$$12) h(x) = \begin{cases} \frac{x^2+4}{x-3} & \text{if } x \neq 3 \\ x-1 & \text{if } x = 3 \end{cases}; h(3)$$

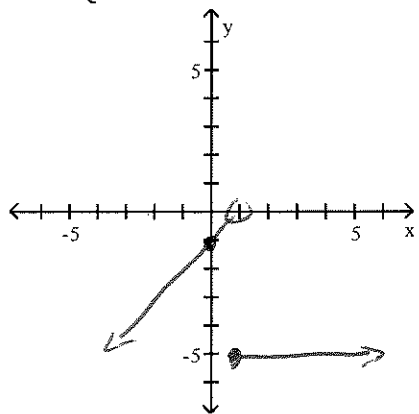
12) 2

$$3-1 = 2$$

Graph the function.

$$13) f(x) = \begin{cases} x-1 & \text{if } x < 1 \\ -5 & \text{if } x \geq 1 \end{cases}$$

13) _____



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

$$14) f(x) = x^2 + 7x + 5$$

14) $2x+h+7$

$$f(x+h) = (x+h)^2 + 7(x+h) + 5$$

$$= x^2 + 2xh + h^2 + 7x + 7h + 5$$

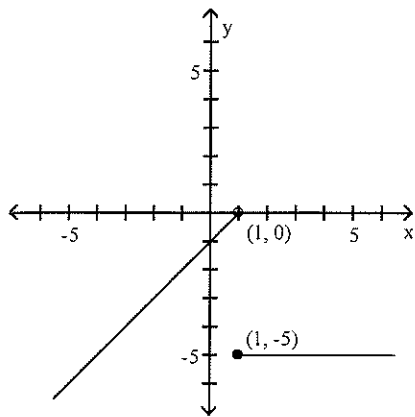
$$\frac{f(x+h) - f(x)}{h} = \frac{\cancel{x^2} + 2xh + h^2 + 7x + 7h + \cancel{5} - \cancel{x^2} - 7x - \cancel{5}}{h}$$

$$= \frac{h(2x+h+7)}{h}$$

Answer Key

Testname: CHAPTER 1 PRACTICE TEST 2017

- 1) B
- 2) B
- 3) A
- 4) $3x^2 - 4x - 2$
- 5) -4
- 6) (-2, 2)
- 7) domain: $(-\infty, \infty)$
range: $(-\infty, 3]$
- 8) minimum: (2, -14); maximum: (-2, 18)
- 9) Even
- 10) Neither
- 11) -2
- 12) 2
- 13)



- 14) $2x + h + 7$
- 15) $y + 4 = -2(x - 1)$ or $y = -2(x + 1)$
- 16) $y = -\frac{1}{2}x - 3$
- 17) $-11x + 6$
- 18) $\frac{3x^2 - 8x}{x^2 - 5x - 24}$
- 19) 120,417
- 20) D
- 21) B
- 22) $f^{-1}(x) = \frac{5x - 8}{7}$
- 23) A