Pre–Calculus    Chapter 1 Review

Determine whether the relation represents a function. If it is a function, state the domain and range.

1) {(29, –2), (4, –1), (4, 0), (5, 1), (13, 3)}

Not a function:  x=4 is used twice with two different y-values.
Domain:  {29, 4, 4, 5, 13} or {29, 4, 5, 13}
Range:  {-2, -1, 0, 1, 3}

**Find the value for the function.**

2) Find f(2) when $f(x) = \dfrac{x^2 - 8}{x + 3}$.

$\dfrac{2^2-8}{2+3}$

$\dfrac{4-8}{5}$

$\dfrac{-4}{5}$

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**Find the domain of the function.**

3) $h(x) = \dfrac{x - 4}{x^3 - 64x}$

$x^3-64x \neq 0$
$x(x^2-64) \neq 0$
$x(x-8)(x+8) \neq 0$
$x \neq 0 \quad x \neq 8 \quad x \neq -8$
$\{x| \; x \neq 0, 8, -8\}$

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

This is a quadratic function and the domain is $(-\infty, \infty)$

For the given functions f and g, find the requested function and state its domain.

5) $f(x) = 3 - 4x$; $g(x) = -7x + 4$

  Find $f + g$.

  3-4x + -7x+4

  -11x+ 7   domain: $(-\infty, \infty)$

6) $f(x) = x + 7$; $g(x) = 6x^2$

  Find $f - g$.

  x+ 7 - $(6x^2)$

  x+7 - $6x^2$   or   $-6x^2$+x + 7

  domain: $(-\infty, \infty)$
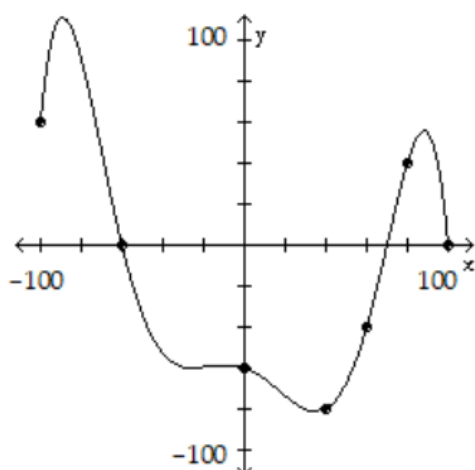
7) $f(x) = \sqrt{x}$; $g(x) = 6x - 5$

  Find $\dfrac{f}{g}$.
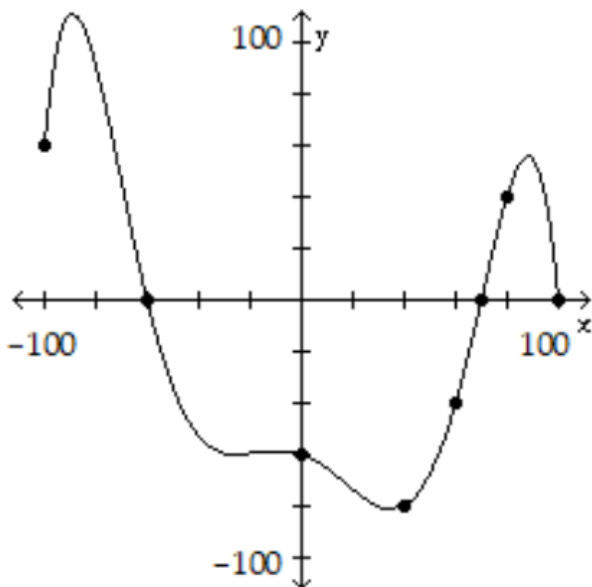
  $$\frac{\sqrt{x}}{6x-5}$$

  Domain: $x \neq 5/6$

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

8) Is $f(-100)$ positive or negative?



Positive because f(-100) is above the x-axis

9) For what numbers x is f(x) = 0?



-60, 70, 100

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

10) $f(x) = \dfrac{x}{x^2 - 3}$     $\dfrac{-x}{(-x)^2 - 3}$     $\dfrac{-x}{x^2 - 3}$     $-f(x) = \dfrac{-x}{x^2 - 3}$

**odd**

so f(-x) = -f(x)    so function is odd

11) $f(x) = \sqrt{x}$     $\sqrt{-x}$     **neither**

-f(x) = $-\sqrt{x}$

12) $f(x) = -7x^2 - 4$     **even**

f(-x) = -7(-x)² - 4
          -7x² - 4
f(-x) = f(x)  even
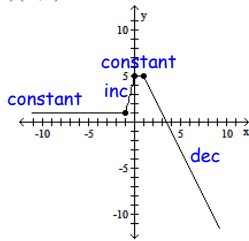
f(-x) = - f(x)   odd function
f(-x) = f(x)     Even function

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.
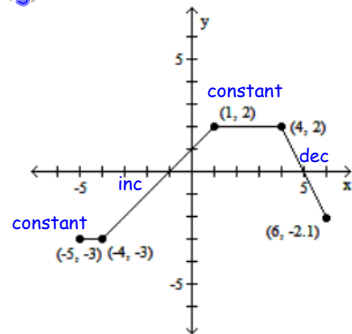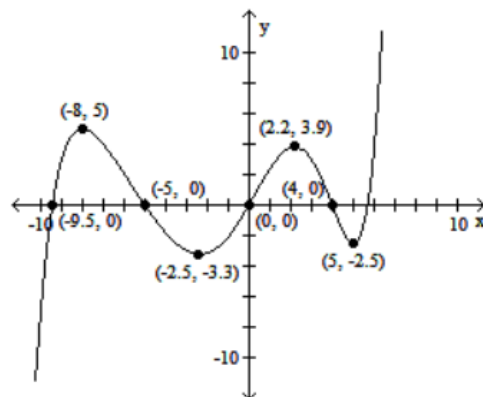
13) (−1, 0)

constant
inc
constant
dec

13) ___increasing___

14) (4, 5)

decreasing

constant
(1, 2)
(4, 2)
dec
inc
(6, -2.1)
constant
(-5, -3) (-4, -3)

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

15)

(-8, 5)
(2.2, 3.9)
(-5, 0)
(4, 0)
(-9.5, 0)
(0, 0)
10 x
(-2.5, -3.3)
(5, -2.5)
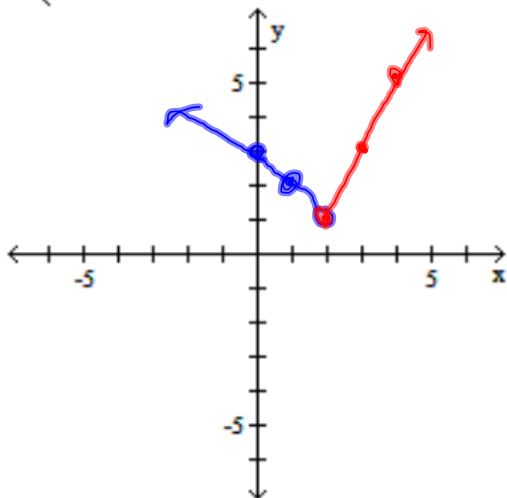
Find the numbers, if any, at which f has a local maximum. What are the local maxima?

maximum points (-8,5) and (2.2, 3.9)
Maximum values and where they occur:
5 at x = -8   and 3.9 at x = 2.2

**Graph the function.**

16)

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

| $x$ | $-x+3$ |
|-----|--------|
| 0 | 3 |
| 1 | 2 |
| 2 | 1 open |

| $x$ | $2x-3$ |
|-----|--------|
| 2 | 1 |
| 3 | 3 |
| 4 | 5 |

**Write an equation that results in the indicated translation.**

17) The absolute value function, shifted 9 units to the left

$$y = |x|$$
$$y = |x + 9|$$

$h = -9$

$|x - h|$ moves left

18) The square root function, shifted 7 units to the right

$$y = \sqrt{x}$$
$$y = \sqrt{x - 7}$$

19) The squaring function, shifted 9 units upward

$$y = x^2$$
$$y = x^2 + 9$$

20) The square root function, shifted 7 units downward

$$y = \sqrt{x}$$
$$y = \sqrt{x} - 7$$

Find the function.

21) Find the function that is finally graphed after the following transformations are applied to the graph of $y = |x|$. The graph is shifted right 3 units, stretched by a factor of 3, shifted vertically down 2 units, and finally reflected across the x-axis.

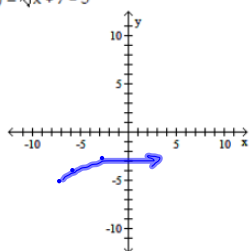$$y = |x|$$
$$y = |x-3|$$
$$y = 3|x-3|$$
$$y = 3|x-3| - 2$$
$$y = - (3|x-3| - 2)$$
or $y = -3|x-3| + 2$

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.
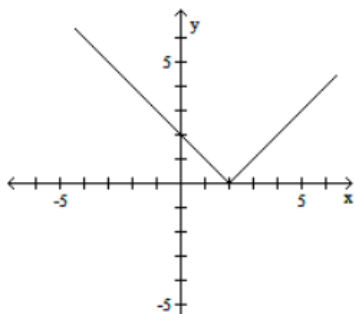
22) $f(x) = \sqrt{x + 7} - 5$　　　　　　　　　　　22) _____



$$\begin{array}{c|c} -7 & -5 \\ -6 & 1-5 = -4 \\ -3 & 2-5 = -3 \end{array}$$

start with the function $y = \sqrt{x}$ then left 7 down 5

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

**Match the correct function to the graph.**

23)



  ⊙ A) $y = |2 - x|$　　　　B) $y = |1 - x|$　　　　C) $y = |x + 2|$　　　　D) $y = x - 2$

 y is the absolute value function parent graph shifted right 2.  $y = |x-2|$
It's not there so it not c  which is a left 2
It's not D which is a line  that has a y-int of -2
so it must be A or B.
B could be written as $y = |-(x-1)|$ which is a flip over y then shifted right 1
A  could be written as $y = |-(x-2)|$  which is a flip over y then shifted right 2

Or you could just use your calculator and see which equation matches the graph!