Precalculus - Functions and Their Properties – section 1.2

Name_____ Date_____ Per_____

**Do this homework on a separate sheet of paper!**

1. Use the graph of the function $f$ to the right to answer the following questions.



a) Find $f(5)$.

b) Find $f(-2)$.

c) Find $f(0)$.

d) Is $f(3)$ positive or negative?

e) Is $f(-1)$ positive or negative?

f) For what values of $x$ is $f(x)=0$?

g) For what values of $x$ is $f(x)<0$?

h) For what values of $x$ is $f(x)>0$?

i) What is the domain of $f$?

j) What is the range of $f$?

k) What are the $x$-intercepts?

l) What is the $y$-intercept?

m) How many times does the line $y=1$ intersect the graph?

n) How many times does the line $x=1$ intersect the graph?

o) For what value of $x$ does $f(x)=3$?
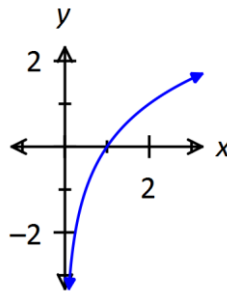
p) For what value of $x$ does $f(x)=-2$?
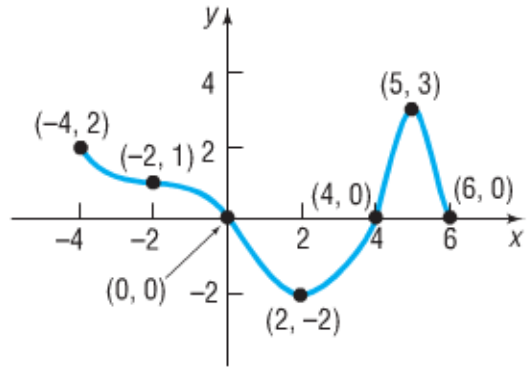
**For the graphs below,**

**a) Determine whether each graph represents a function.**

**b) State the domain and range.**

**c) State whether the graph has any symmetry with respect to the $x$-axis, $y$-axis, or origin (it may have more than one type or none).**

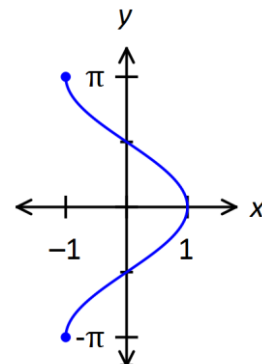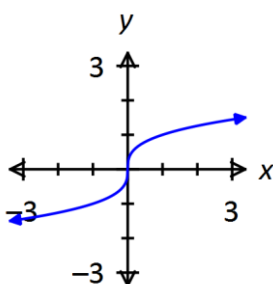**d) If the graph is that of a function, state whether the function is even, odd, or neither.**
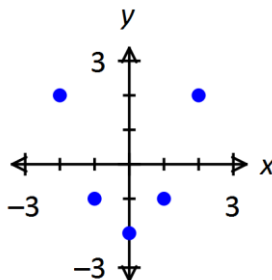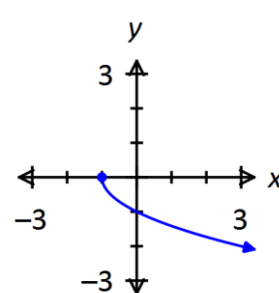
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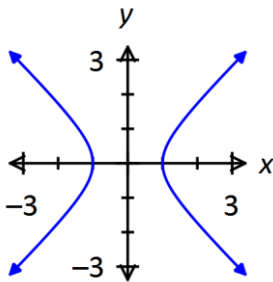


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4.



5.



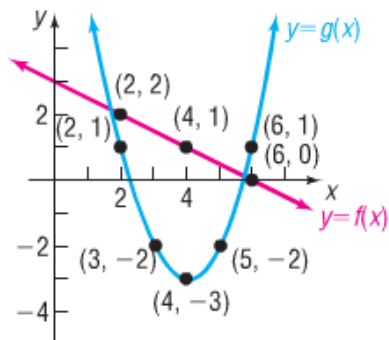6.



7.

8. The graph of two functions, $f$ and $g$ is given below. Use the graph to find the following values.

a) $(f+g)(4)$

b) $(f-g)(6)$

c) $(f \cdot g)(2)$

d) $\left(\dfrac{f}{g}\right)(4)$

9. $f(x) = 2x^2 + 11x + 5$

a) Is the point $(3, 74)$ on the graph of $f$?

b) If $x = -2$, what is $f(x)$? What point is on the graph of $f$?

c) If $f(x) = -10$, what is $x$? What points are on the graph of $f$?

d) What is the domain of $f$?

e) Find the $x$ intercepts, if any, of the graph of $f$.

f) Find the $y$ intercept, if any, of the graph of $f$.

10. $f(x) = \dfrac{x+3}{x-6}$

a) Is the point $(1, -4/5)$ on the graph of $f$?

b) If $x = 3$, what is $f(x)$? What point is on the graph of $f$?

c) If $f(x) = -1/8$, what is $x$? What points are on the graph of $f$?

d) What is the domain of $f$?

e) Find the $x$ intercepts, if any, of the graph of $f$.

f) Find the $y$ intercept, if any, of the graph of $f$.

11. The path a basketball follows during a foul shot can be modeled by the function

$h(x) = -\dfrac{44x^2}{v^2} + x + 6$, where $h$ is the height of the ball above the floor, in feet, $x$ is the forward distance of the ball in front of the foul line, in feet, and $v$ is the initial velocity of the ball in feet per second.

a) Suppose a player shoots the ball at 28 feet per second. Find the ball's height after it has traveled 8 feet and 12 feet in front of the foul line.

b) The center of the hoop is 10 feet above the floor and 15 feet in front of the foul line. Will the ball go through the hoop? How do you know? If not, with what initial velocity must the ball be shot in order to go through the hoop?

12. Use the graph to the right to answer the following questions.

a) On what interval(s) is the function increasing?

b) On what interval(s) is the function decreasing?

c) On what interval(s) is the function constant?

d) At what number(s) does the function have a relative maximum?

e) What are the relative maximum values?
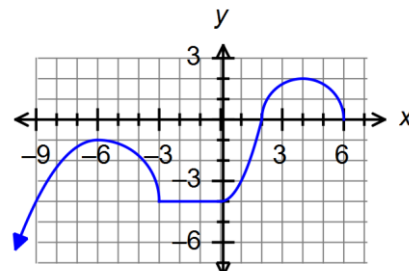
13. Use the graph below to answer the following questions.
   a) On what intervals is the function increasing?
   b) On what intervals is the function decreasing?
   c) At what value, if any, is there an absolute minimum? What is the absolute minimum?
   d) At what value, if any, is there an absolute maximum? What is the absolute maximum?
   e) At what number(s) does the function have a local minimum? What are the local minimum values?
   f) At what number(s) does the function have a local maximum? What are the local maximum values?
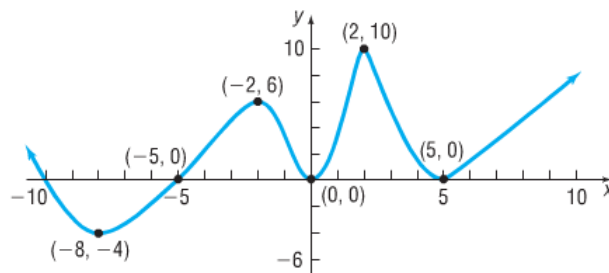
For each function below, do the following:
   a) Find $f(-x)$
   b) Find $-f(x)$
   c) State whether the function is even, odd, or neither, and justify your answer.

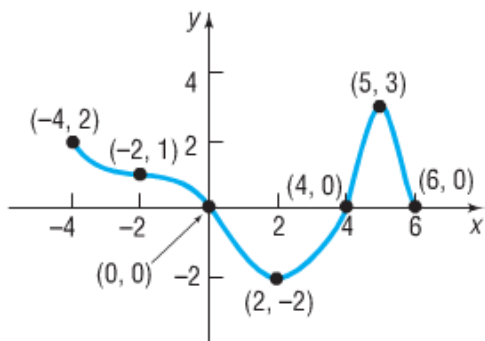14. $f(x) = 3x^3$

15. $f(x) = \sqrt[5]{x} + x^2$

16. $f(x) = -2x^4 + 6$

17. $f(x) = x + |x|$

18. $f(x) = \dfrac{x^2 + 9}{-2x}$

19. $f(x) = \dfrac{3}{-5x^2}$

20. State whether each labeled point identifies a local minimum, a local maximum, or neither.

Use a graphing calculator to graph each of the following functions and identify intgervals on which the function is increasing, decreasing, or constant.

21. $f(x) = |x + 1| + |x - 1| - 3$

22. $f(x) = 3 - (x - 1)^2$

Use a graphing calculator to find all local maxima and minimum and the values of $x$ where they occur. Give values rounded to the nearest hundredths.

23. $f(x) = 4 - x + x^2$

24. $f(x) = (x + 3)(x - 1)^2$