SM 3H

2023-2024

Unit 2 Review

SCORE: /

Name _____ **Date** _____ **Period** _____

Find the value for the function.

1. Find $f(-2)$ when $f(x) = \frac{x-2}{x^2+5}$.

2. Find $f(4)$ when $f(x) = -2x^2 + x - 1$.

3. Find $f(-x)$ when $f(x) = \frac{2x}{x^2-7}$.

4. Find $f(x+1)$ when $f(x) = 3x^2 + 5x - 7$.

Find the domain of the function (in interval notation).

5. $f(x) = \frac{5x}{x^2-49}$

6. $f(x) = \sqrt{15 - 3x}$

7. $f(x) = -2|x| + 8$

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

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

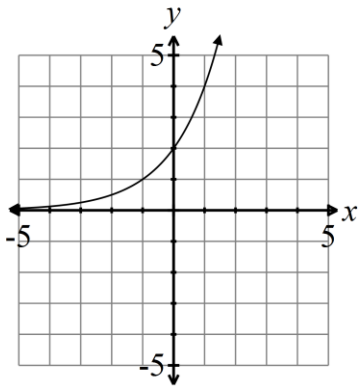
Domain:

9. $f(x) = \sqrt{2x}$; $g(x) = 2x - 7$. Find $\frac{f}{g}$.

Domain:

Determine whether the graph is that of a function. If it is, use the graph to find its domain and range, the intercepts, if any, and any symmetry with respect to the *x*-axis, the *y*-axis, or the origin.

10.



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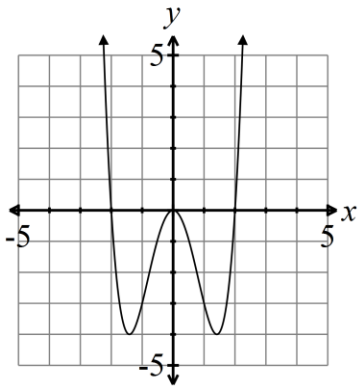
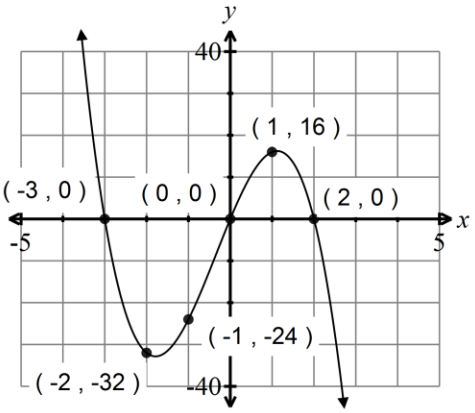


The graph of a function f is given. Use the graph to answer the questions 12 & 13.

12. Find $f(1)$.

13. For what numbers x is $f(x) = 0$?

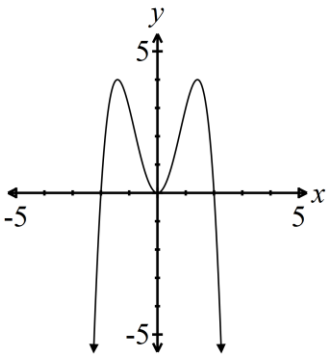


14. Find where the graph is positive:

15. Find where the graph is negative:

The graph of a function is given. Decide whether it is even, odd, or neither.

16.



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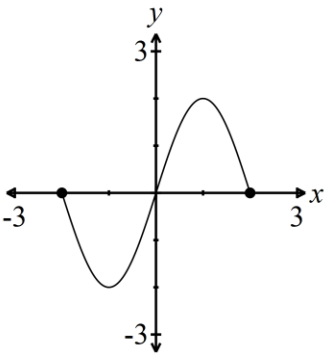


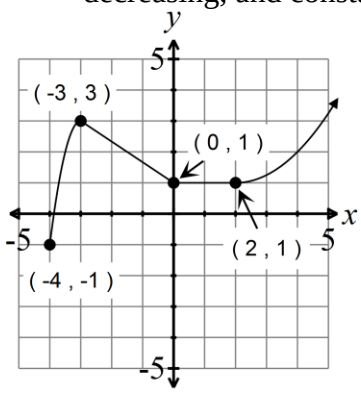
Determine <u>algebraically</u> whether the function is even, odd, or neither. <u>No work no credit.</u>

18. $f(x) = \frac{2x}{3x^2-5}$

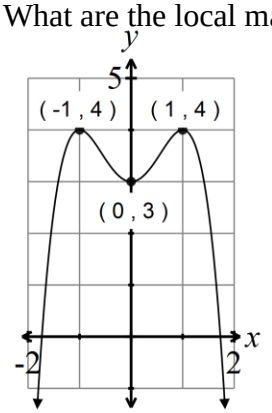
19. $f(x) = -4x^6 - 5x^4 + 8x^2 - 2$

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

20. Find the intervals on which the function is increasing, decreasing, and constant.

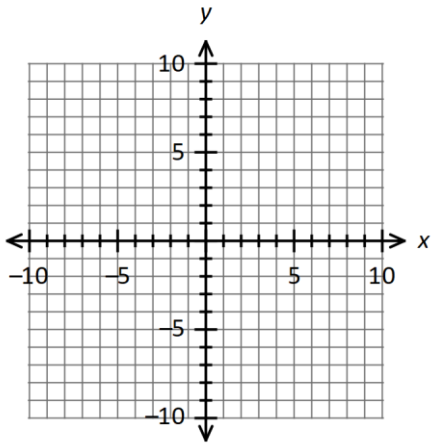


21. Find the numbers, if any, at which f has a local maximum. What are the local maxima?



Graph the function.

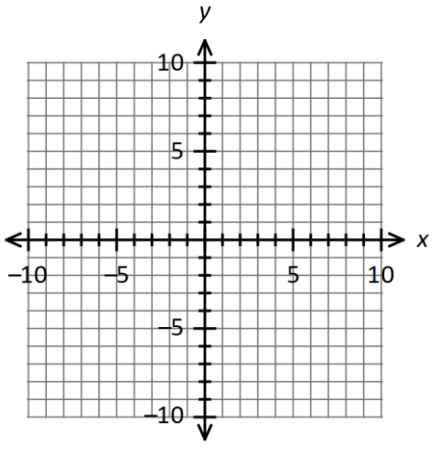
22. $f(x) = \begin{cases} \frac{1}{2}x & \text{if } -4 \le x < 2 \\ -2x + 5 & \text{if } x \ge 2 \end{cases}$



A.) Find $f(-3)$. B.) Find $f(2)$.

C.) Find the domain in interval notation.

23. $f(x) = \begin{cases} x^2 & \text{if } -2 \le x \le 2 \\ 2x - 12 & \text{if } 2 < x \le 5 \end{cases}$

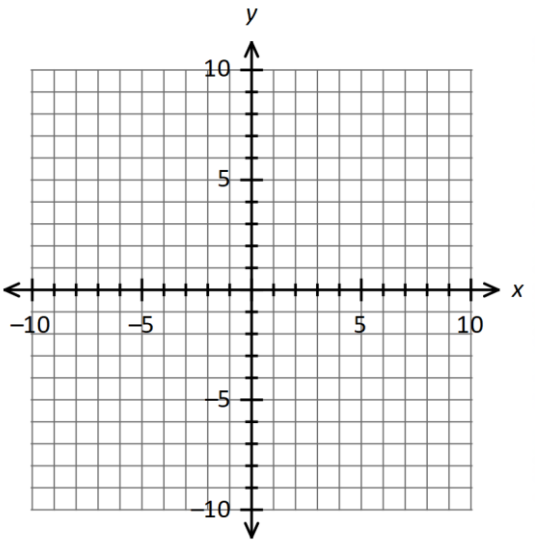


A.) Find $f(4)$. B.) Find $f(0)$.

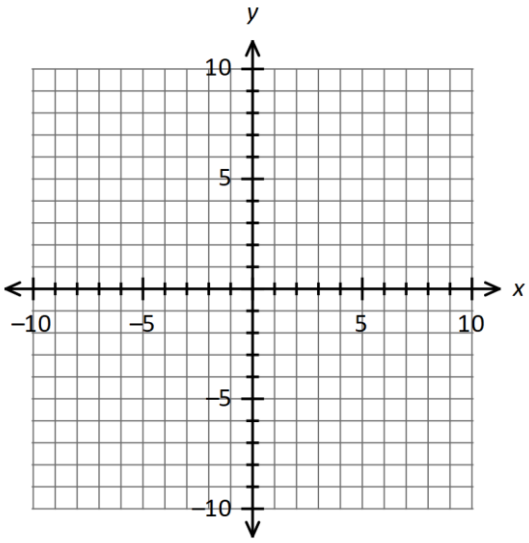
C.) Find the domain in interval notation.

Graph the function by starting with the graph and table of key points from the parent function and then using the techniques of shifting, compressing, stretching, and/or reflections. Write the transformations in order.

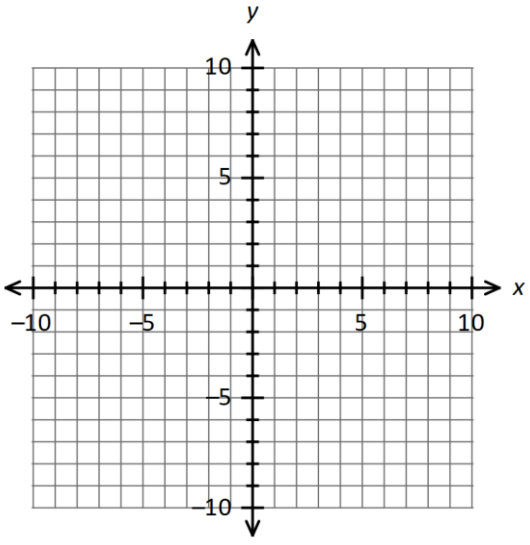
24. $f(x) = -2|x - 3|$



25. $f(x) = 3\sqrt[3]{x+1} - 4$



26. $f(x) = \frac{1}{2}\sqrt{-x} + 3$



Write an equation that results in the indicated translation.

27. The square root function, shifted 2 units downward.

28. The reciprocal function, shifted 3 units to the left.

Find the function.

29. Find the function that is finally graphed after the following transformations are applied to the graph of $y = x^2$. The graph is reflected across the *x*-axis, stretched vertically by a factor of 2, shifted left 5 units and shifted vertical up 7 units.

Find the average rate of change for each function in the intervals given.

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

a) $[0, 4]$ *b*) $[-1, 1]$

31. $f(x) = \dfrac{3}{x-1}$

a) $[0, 2]$ *b*) $[-2, 4]$

32. Let $P = (x, y)$ be a point on the graph of $y = x^2 - 9$.

a) Express the distance *d* from *P* to the point (0, 1) as a function of *x*.

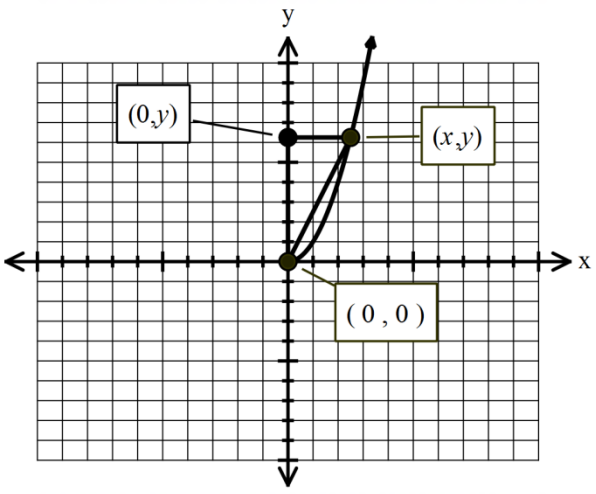
b) What is *d* if *x* = 0?

c) What is *d* if *x* = 2?

d) Use a graphing utility to graph *d* = *d*(*x*). Sketch the graph.

e) For what values of *x* is *d* smallest?

33. A right triangle has one vertex on the graph of $y = x^2$, $x > 0$, at (*x*, *y*), another at the origin, and the third on the positive *y*-axis at (0, *y*), as shown in the figure. Express the area A of the triangle as a function of *x*.



34. An open box is made from a rectangular piece of cardboard measuring 20 inches by 12 inches, by cutting identical squares from the corners and turning up the sides. The length of the finished box cannot be less than 12 inches.

a) Draw and **label** a model of this problem.

b) Write a **function** for the volume of the box.

c) Give the domain of the function in the context of the problem. Answer should be in interval notation.

d) Give one dimension that the corner squares could have and find the volume for the box. Show work! (Use a whole number!)

e) Use technology to find the maximum volume the box can have. Give the dimensions (length, width, and height) of the box and the maximum volume, round to the nearest tenth of an inch.

length =_____ width =_____ height =_____ volume =_____

35. A service committee is organizing a fundraising dinner. The cost of renting a facility is $450 plus $6 per chair, where x represents the number of people attending the fundraiser. The committee plans to charge attendees $25 each.

a) Express the cost of providing x dinners as a function of x.

b) Express the total revenue of providing x dinners as a function of x.

c) Create a profit function. (revenue – cost = profit)

d) How many dinners must be sold to make a profit of $1678 at the fundraiser? Explain your answer.