MTH130
Chapter 2 Practice

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Use the function to evaluate the indicated expressions and/or simplify.

1. $f(x)=2x^2-x+12$; **find** $f(a+5)$

2. $h(x)=\begin{cases}3x^2-1 & \text{if } x<-1\\ 5x-2 & \text{if } x\geq -1\end{cases}$

a) Find $h(0)$

b) Find $h(-1)$

c) Find $h(-2)$

Find the domain of the function in interval notation.

3. $h(x)=\dfrac{x-3}{x+8}$

4. $f(x)=\sqrt{4-x}$

5. $g(x)=\dfrac{x-3}{x^2+9}$

6. $r(x)=\dfrac{\sqrt{x-3}}{x-5}$

7. $v(x)=\dfrac{4}{x^2-16}$

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8. Answer the following questions:

The graph of $y = f(3x)$ is the graph of $y = f(x)$ with a (choose one: vertical stretch, vertical shrink, horizontal stretch, horizontal shrink).

The graph of $y = \frac{1}{3}f(x)$ is the graph of $y = f(x)$ with a (choose one: vertical stretch, vertical shrink, horizontal stretch, horizontal shrink).

The graph of $y = 3f(x)$ is the graph of $y = f(x)$ with a (choose one: vertical stretch, vertical shrink, horizontal stretch, horizontal shrink).

The graph of $y = f\left(\frac{1}{3}x\right)$ is the graph of $y = f(x)$ with a (choose one: vertical stretch, vertical shrink, horizontal stretch, horizontal shrink).

The graph of $y = -f(x)$ is the graph of $y = f(x)$ reflected across the _____ -axis.

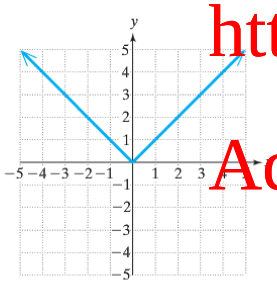
9.

For Exercises 15–20, from memory match the equation with its graph.

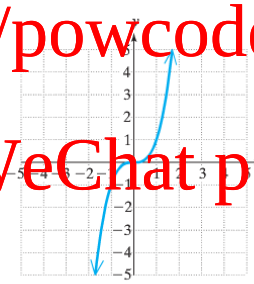
15. $f(x) = \sqrt{x}$ **16.** $f(x) = \sqrt[3]{x}$ **17.** $f(x) = x$

18. $f(x) = x^2$ **19.** $f(x) = |x|$ **20.** $f(x) = \frac{1}{x}$

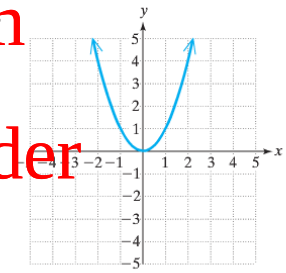
a.



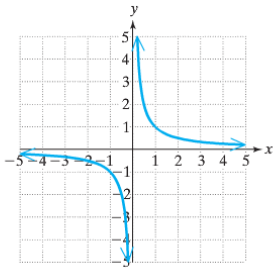
b.



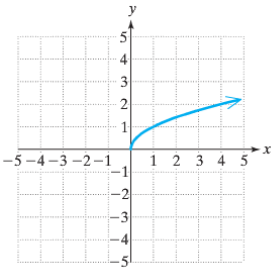
c.



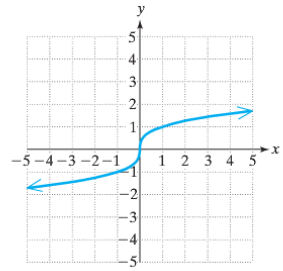
d.



e.



f.



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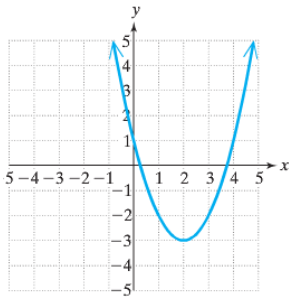
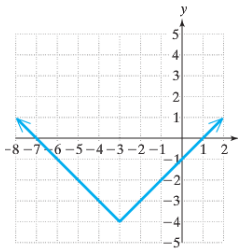
10

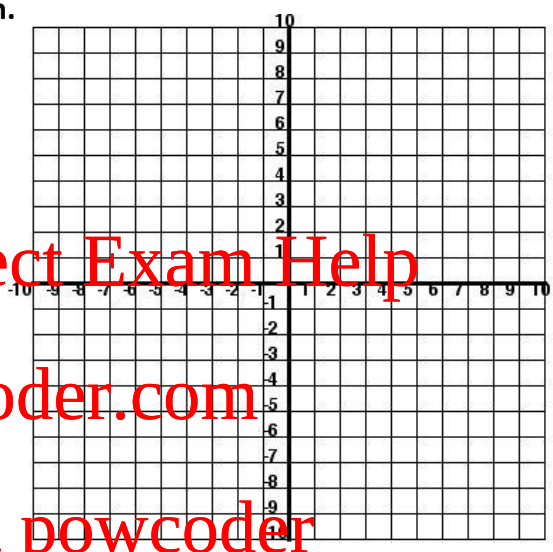
For Exercises 87–92, use transformations on the basic functions presented in Table 2-2 to write a rule $y = f(x)$ that would produce the given graph.





Sketch the graph of the piecewise defined function.

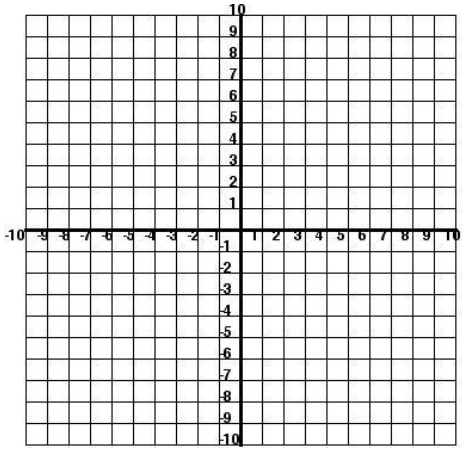
11. $f(x)=\begin{cases} -2 & \text{if } x<-3 \\ x-1 & \text{if } -3\le x<0 \\ x^2 & \text{if } x\ge 0 \end{cases}$



12. For $g(x)=-|x+2|-1$

a) Describe the transformations on the graph.

b) Sketch the graph of the function by applying transformations to the graph of the standard function.



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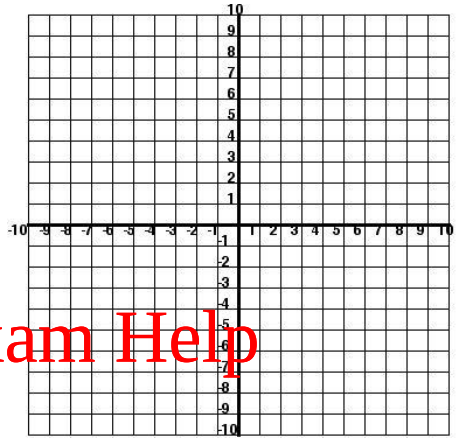
13. For $g(x)=2(x-1)^2-4$

a) Describe the transformations on the graph.

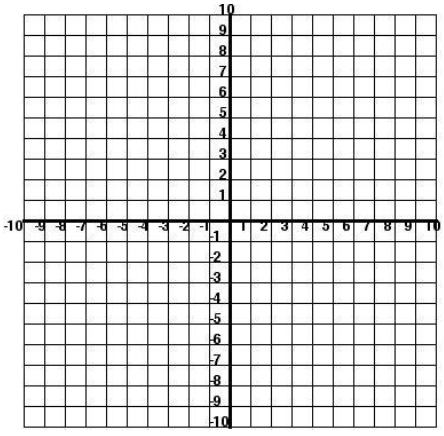
b) Sketch the graph of the function by applying transformations to the graph of the standard function.



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

a) Describe the transformations on the graph.

b) Sketch the graph of the function by applying transformations to the graph of the standard function.



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A function *f* is given, and the indicated transformations are applied to its graph (in the given order). Write the equation for the final transformed graph.

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

The graph is reflected in x-axis, compressed vertically by a factor of ½ , right 40 units, up 90 units.

Use $f(x)=x^2+5x-1$ **and** $g(x)=3-2x$ **to evaluate and/or simplify the expression.**

16. Find $(f-g)(x)$.

17. Find $(f\cdot g)(x)$.

18. Find $(g\circ f)(x)$

19. Find $(g\circ g)(2)$

20. Find $f(g(1))$

21. $(f\circ g)(x)$

22. $(f+g)(-2)$

23. Domain of f: _____
24. Domain of g: _____
25. Domain of f + g, f – g, fg: _____
26. Domain of f/g: _____
27. Domain of $(f\circ g)(x)$**:** _____
28. Domain of $(g\circ f)(x)$**:** _____

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29. Find the difference quotient of the function *f*.

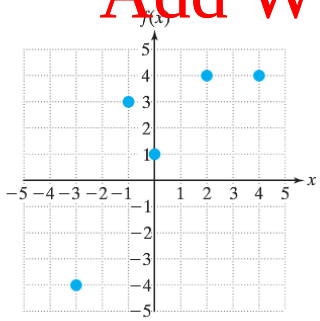
That is, find $\frac{f(x+h)-f(x)}{h}$**. Use the function** $f(x)=5x-3$

30. Find the difference quotient of the function *f*.

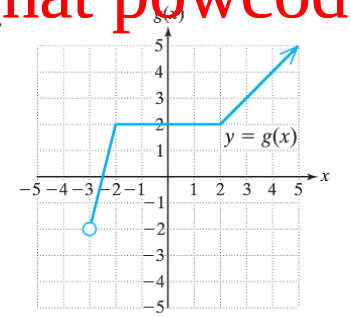
That is, find $\frac{f(x+h)-f(x)}{h}$**. Use the function** $f(x)=x^2+3x-2$

31 Determine the domain and range for the functions shown.

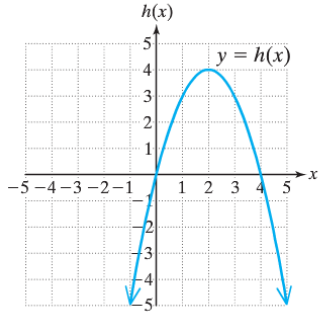
a.



b.



c.



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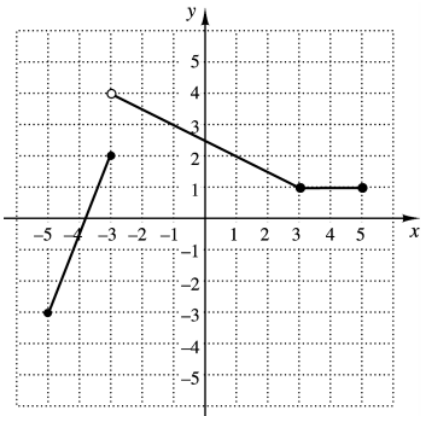
32. Find all information below for the graph of the function.



Find *f* (3). _____

Find *f* (-3). _____

Find *f* (6). _____

Find the domain of *f* in interval notation: _____

Find the range of *f* in interval notation: _____

Name the intervals where *f* is INCREASING. _____

Name the intervals where *f* is DECREASING. _____

Name the intervals where *f* is CONSTANT. _____

Find all value(s) for x where $f(x) = \mathbf{2}$. _____

The point (-1, 3) lies on the graph of *f*. What would that point become on the graph of $y = f\left(\frac{1}{3}x\right)$?

_____

The point (-1, 3) lies on the graph of *f*. What would that point become on the graph of $y = 3f(x)$?

_____

The point (-1, 3) lies on the graph of *f*. What would that point become on the graph of $y = f(x+5)$?

_____

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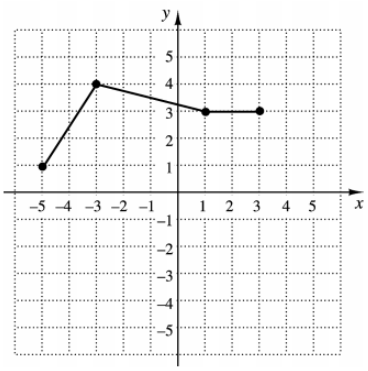
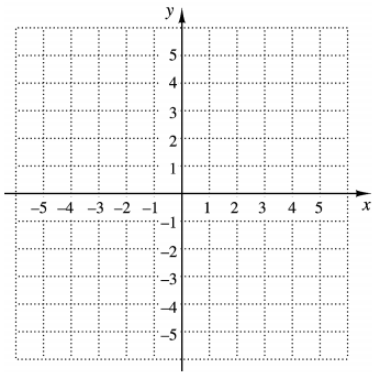
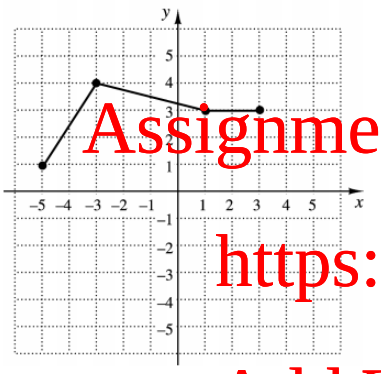
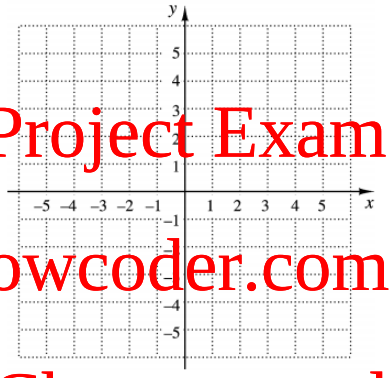
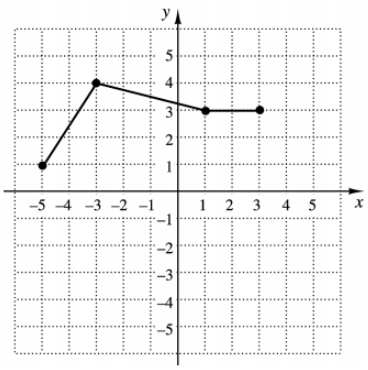
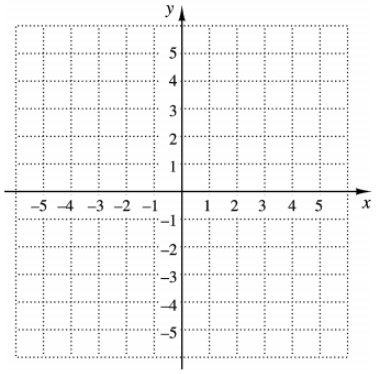
33. The graph of a function *y = f(x)* is shown below. No formula for *f* is given. Make a graph of $y = f(x-5)$.

34. The graph of a function *y = f(x)* is shown below. No formula for *f* is given. Make a graph of $y = f(x)+1$.

35. The graph of a function *y = f(x)* is shown below. No formula for *f* is given. Make a graph of $y = f(2x)$.

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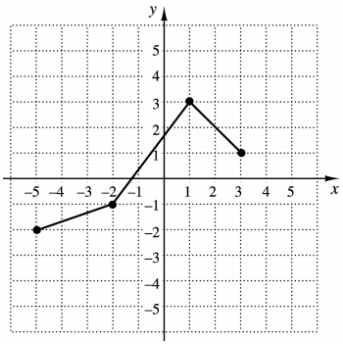
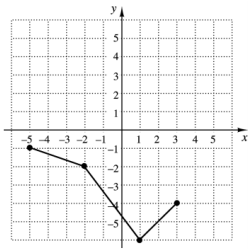
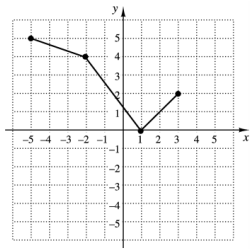
36. **The graph of the function *f* is shown to the left. Which of the following represents the graph of** $g(x)=-f(x)-3$?



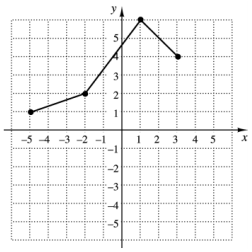
A.



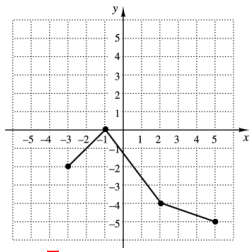
B.



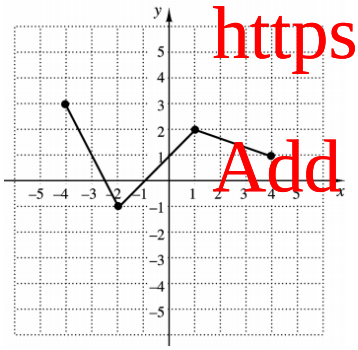
C.



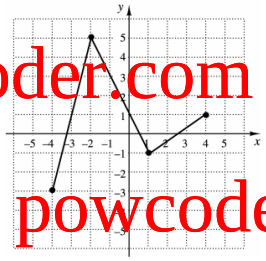
D.



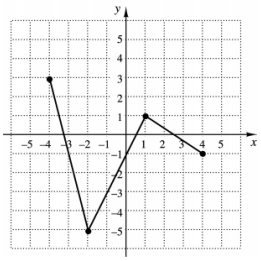
37. **The graph of the function *f* is shown to the left. Which of the following represents the graph of** $g(x)=-2f(x)+3$?



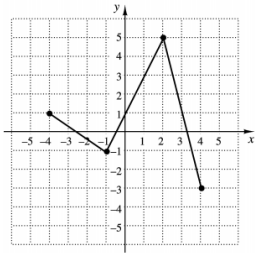
A.



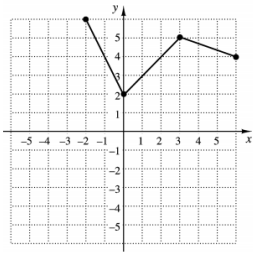
B.



C.



D.



38. Write an equation for a function that has the shape of $y=|x|$, but is shifted right 2 units and down 6 units.

a) $f(x)=|x+2|-6$ b) $f(x)=|x-2|+6$

c) $f(x)=|x+2|+6$ d) $f(x)=|x-2|-6$

Write an equation for a function that has the shape of $y=x^2$, but is shifted left 3 units and up 4 units.

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

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