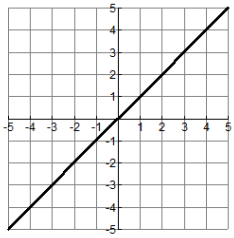
SM 3H 2023-2024

2.5 Transformations

SCORE: /

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

Match each parent graph with the correct parent function and name the function.

1. 

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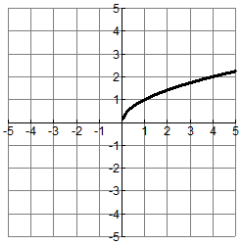
2. 

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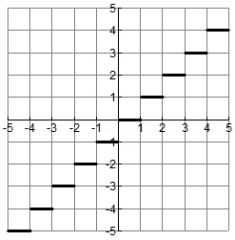
3. 

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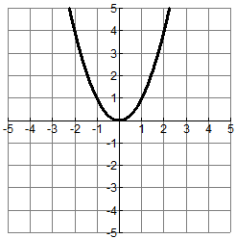
4. 

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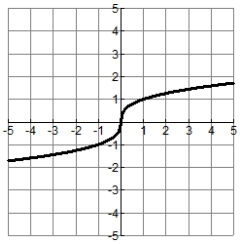
5. 

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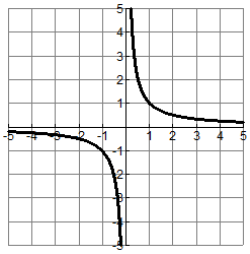
6. 

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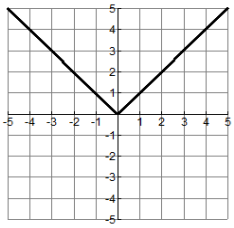
7. 

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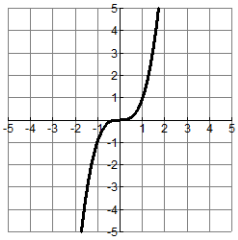
8. 

Name:_____

a) $f(x)=\sqrt{x}$ b) $f(x)=x^3$ c) $f(x)=\frac{1}{x}$

d) $f(x)=x^2$ e) $f(x)=\sqrt[3]{x}$ f) $f(x)=|x|$

g) $f(x)=x$ *h)* $f(x)=\text{int}(x)$

9. Suppose that the graph of a function *f* is known. Then the graph of $y = f(x - 2)$ may be obtained by a(n) _____ shift of the graph *f* to the _____ a distance of 2 units.

10. Suppose that the graph of a function *f* is known. Then the graph of $y = f(-x)$ may be obtained by a reflection about the _____ - axis of the graph of the function $y = f(x)$.

11. Suppose that the graph of a function *g* is known. The graph of $y = g(x) + 2$ may be obtained by a _____ shift of the graph of *g* _____ a distance of 2 units.

12. **True of False** The graph of $y = -f(x)$ is the reflection about the x-axis of the graph of $y = f(x)$.

13. **True of False** To obtain the graph of $f(x) = \sqrt{x+2}$, shift the graph of $y = \sqrt{x}$ horizontally to the right 2 units.

14. **True of False** To obtain the graph of $f(x) = x^3 + 5$, shift the graph of $y = x^3$ vertically up 5 units.

Describe how the graph of the given function can be transformed into the equations for a-c.

15. $f(x) = x^2$

$a)$ $y = -x^2$

$b)$ $y = \frac{1}{2}x^2$

$c)$ $y = x^2 + 5$

16. $f(x) = |x|$

$a)$ $y = -3|x| + 4$

$b)$ $y = |x - 7| + 2$

$c)$ $y = \frac{1}{4}|x + 1|$

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

a) $y = \sqrt{x+5} - 1$

b) $y = \sqrt{2x} + 7$

c) $y = \frac{1}{3}\sqrt{x-1}$

18. $f(x) = \frac{1}{x}$

a) $y = \frac{1}{x-4} + 2$

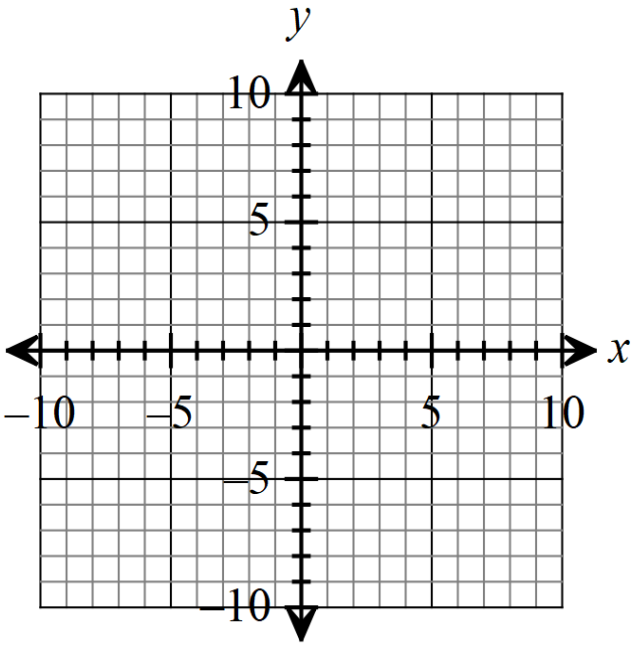
b) $y = -3\left(\frac{1}{x}\right) - 8$

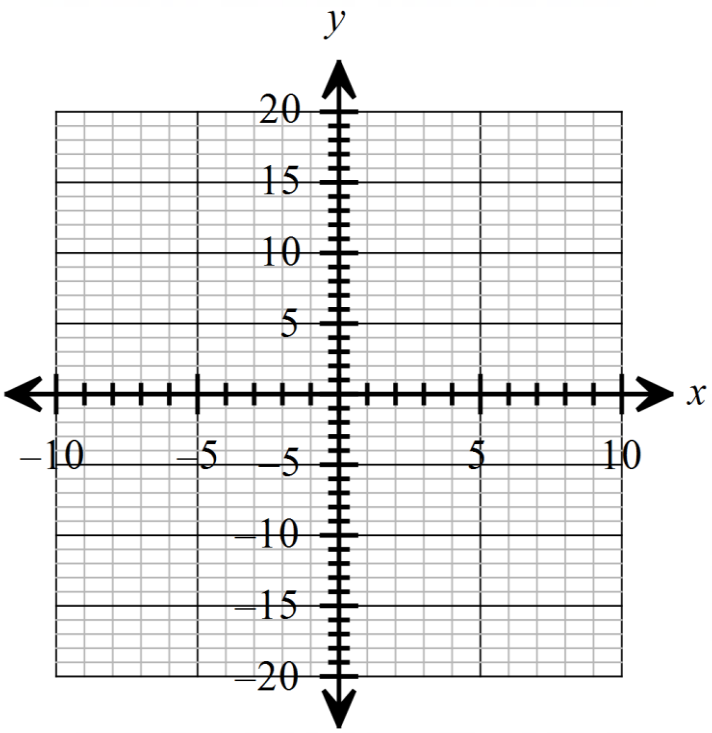
c) $y = \frac{1}{-(x+7)}$

Sketch the graphs of each function by hand. Use a table with the key points for the parent function then perform the transformations that will give the new points in a new table. State the transformations.

19. $f(x) = \sqrt[3]{x+2}$

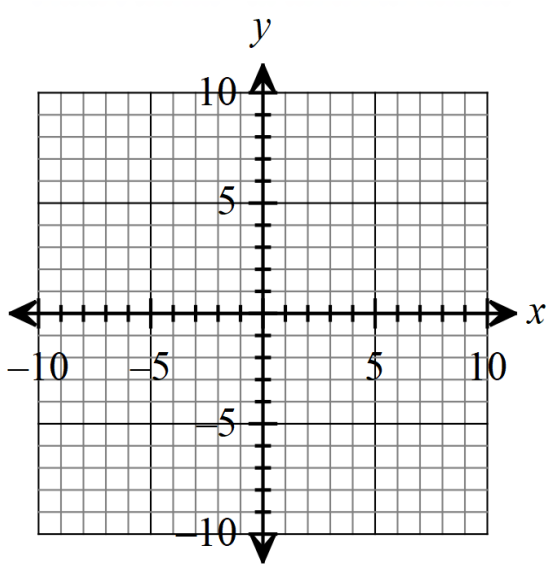
20. $f(x) = 2x^3 - 3$

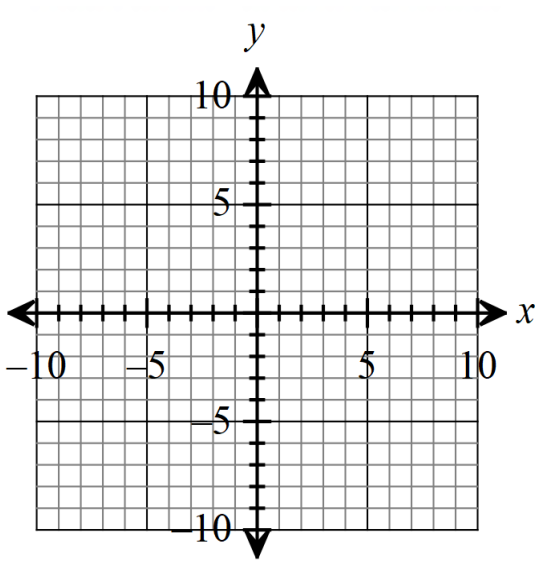




21. $f(x) = -\sqrt{x-2}$

22. $f(x) = -2|x-1| + 2$





Find the equation of the reflection of *f* across the a) *x*-axis and b) the *y*-axis.

23. $\boldsymbol{f(x) = x^3 - 2x^2 - 3x + 5}$

24. $\boldsymbol{f(x) = 3\sqrt{x+2} - 5}$

25. $\boldsymbol{f(x) = \sqrt[3]{27x}}$

26. $\boldsymbol{f(x) = -2|x-4|}$

Describe a basic parent function and a sequence of transformations that can be used to produce a graph of the given function.

27. $\boldsymbol{f(x) = -(x-4)^3 - 2}$

28. $\boldsymbol{f(x) = 3\sqrt{-x} + 5}$

29. $\boldsymbol{f(x) = -2(x-1)^2 + 5}$

30. $\boldsymbol{f(x) = |5x| - 3}$

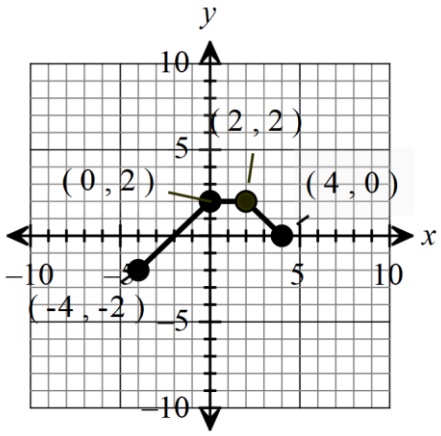
Write the equation for the new function that is obtained from the given transformations on the parent function.

31. $\boldsymbol{f(x) = \sqrt[3]{x}}$: a vertical stretch by a factor of 2, horizontal shift left 3.

32. $f(x) = |x|$: a shift left 2 units, then a vertical stretch by a factor of 3, then a shift up 4 units.

33. The graph of the function f is illustrated. Use the graph of f as the first step toward graphing each of the following function.

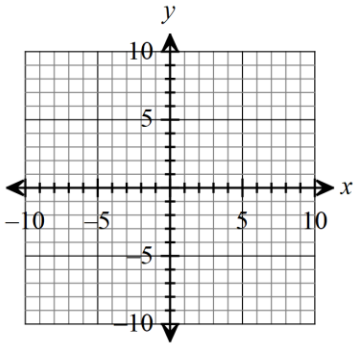
$f(x)$



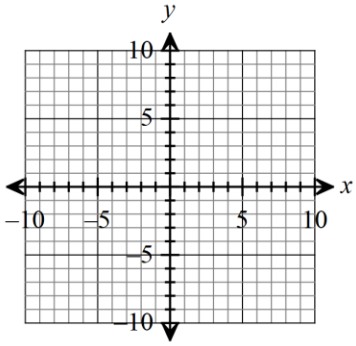
a.) $g(x) = f(x) + 3$ b.) $g(x) = f(x + 2)$ c.) $g(x) = -f(x)$ d.) $g(x) = f(x + 1) - 2$

e.) $g(x) = \frac{1}{2}f(x)$ f.) $g(x) = f(-x)$ g.) $g(x) = f(2x)$

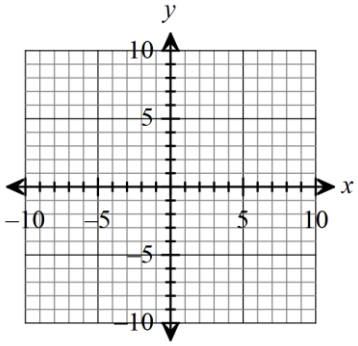
a.)



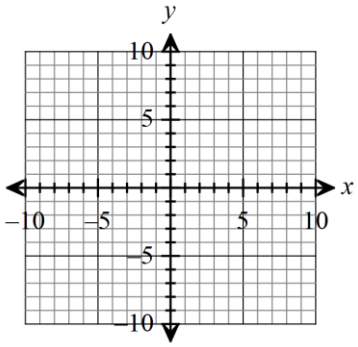
b.)



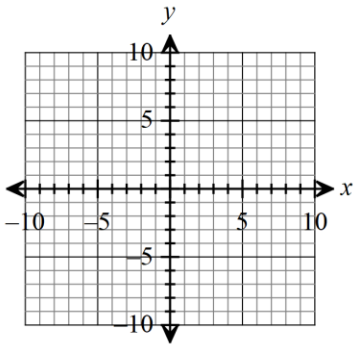
c.)



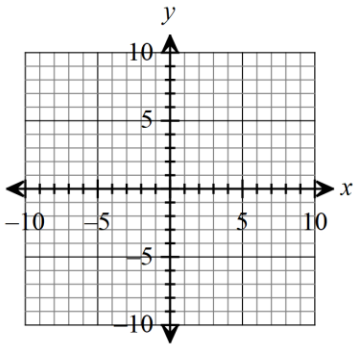
d.)



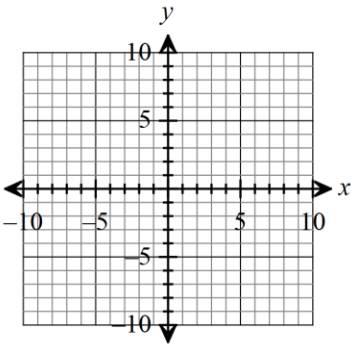
e.)



f.)



g.)



34. Suppose (1, 3) is a point on the graph of $f(x)$.

a.) What point is on the graph of $y = f(x + 3) - 5$

b.) What point is on the graph of $y = -2f(x - 2) + 1$

c.) What point is on the graph of $y = f(-2x + 4)$

Divide using long division.

35. $\frac{x^2-2x-30}{x+5}$

Solve.

36. $5x - 8 = -x - 4$