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Lesson 1: Function Family Reunion

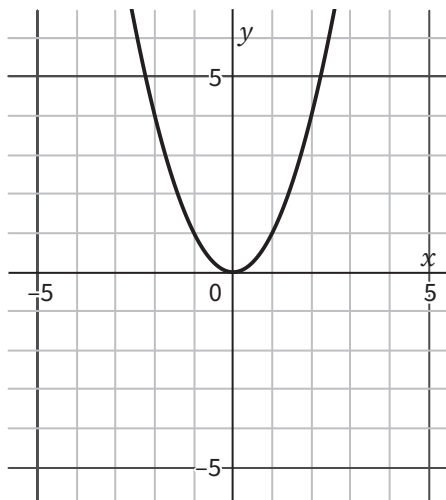
Ready, Set, Go



Ready

Graph the equations on the corresponding grid.

1. The graph of $y = x^2$ is shown.
 - a. Graph the equations on the grid provided.



- a. $y_1 = x^2 - 2$
- b. $y_2 = (x - 2)^2$
- c. $y_3 = 2x^2$

- b. For each new equation, explain what the number 2 does to the graph of $y = x^2$. Identify what changes in the graph and what stays the same. Pay attention to the y -intercept, the x -intercept(s), and the rate of change.



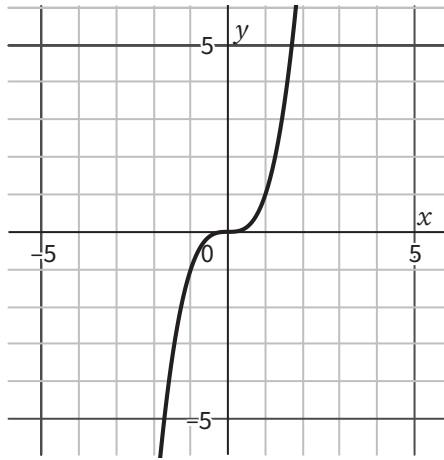
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2. The graph of $y = x^3$ is shown.

a. Graph the equations on the grid provided.



a. $y_1 = x^3 + 3$

b. $y_2 = (x + 3)^3$

c. $y_3 = 3x^3$

b. For each new equation, explain what the number 3 does to the graph of $y = x^3$. Identify what changes in the graph and what stays the same. Pay attention to the y -intercept, the x -intercept(s), and the rate of change.

 **Set**

Sketch the graph of the parent function and the graph of the transformed function on the same set of axes.

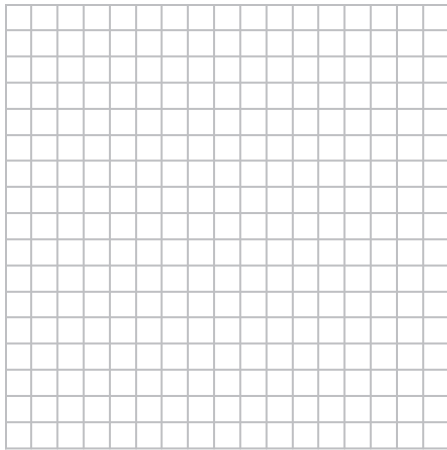
3. $h(x) = 2^x$, and $j(x) = 2^{-x}$



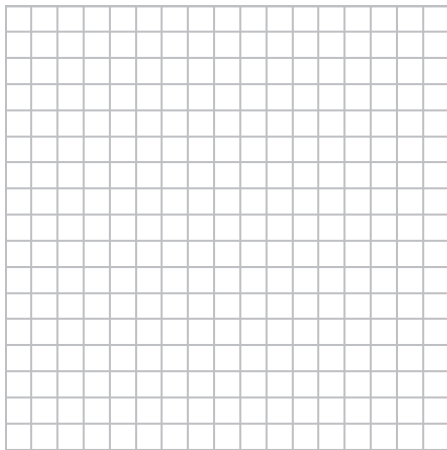
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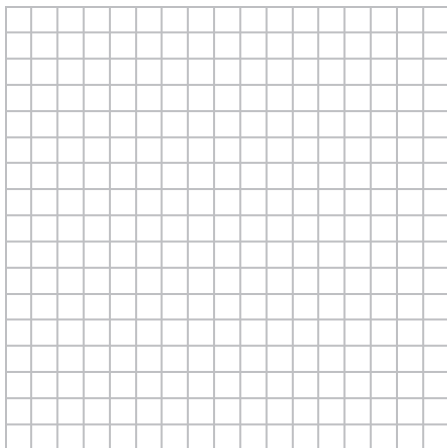
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4. $r(x) = x^2$, and $s(x) = -\frac{1}{2}x^2 + 5$



5. $v(x) = \frac{1}{x}$, and $w(x) = -\frac{1}{x}$





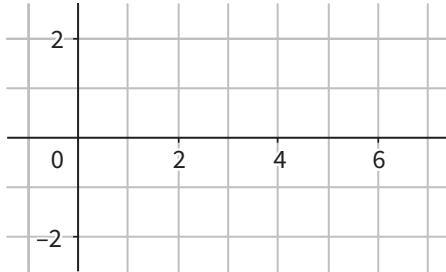
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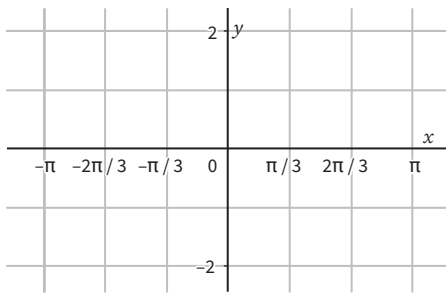
6. $k(x) = \log(x)$,

and $m(x) = -1 + \log(x)$



7. $p(x) = \sin(x)$,

and $q(x) = 2 \sin\left(x + \frac{\pi}{3}\right)$



8. Use the graph and the table to write the rule for each of the different transformations of the parent graph represented in the columns labeled image 1 and image 2. Write the transformation rule as a geometric transformation of the original image, using the set of coordinate points, and then write the rule using algebraic function notation. Graph image 1 and image 2 on the same set of axes. (It's possible that not all of the transformed points will fit on the given set of axes.)

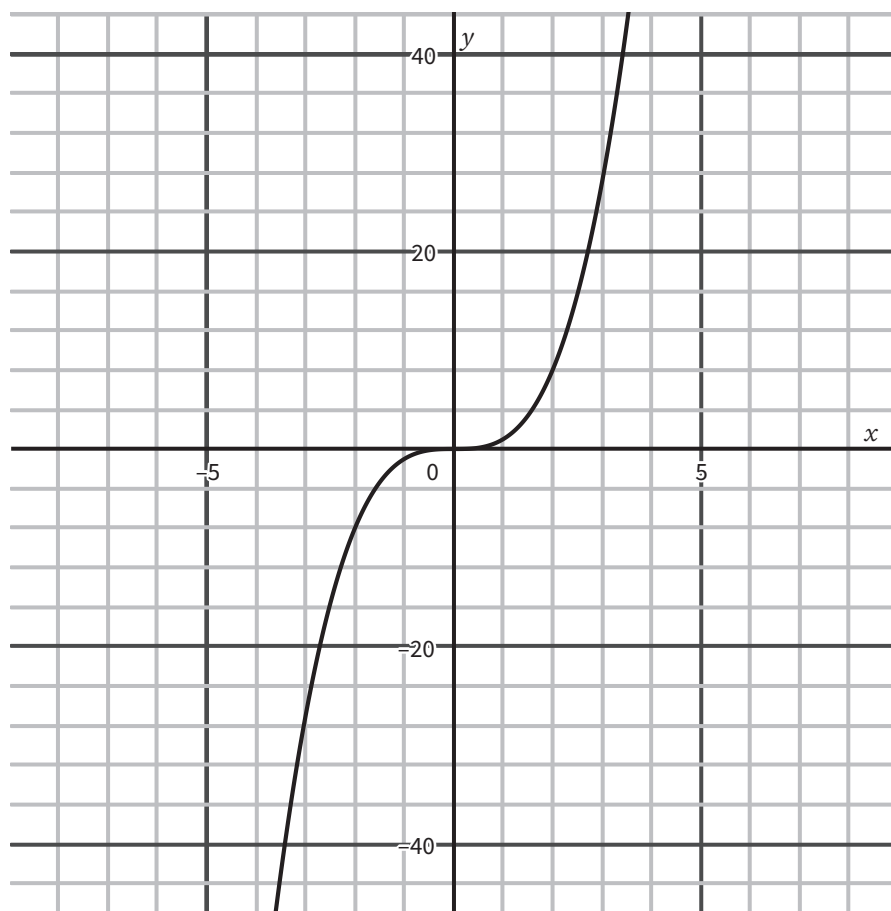
Graph of parent function: $f(x) = x^3$



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	pre-image (parent function)	image 1	image 2
geometric notation	(x, y)	$(x, y) \rightarrow$ $(x, \underline{\hspace{2cm}})$	$(x, y) \rightarrow$ $(\underline{\hspace{2cm}}, y)$
function notation	$f(x) = x^3$	$f_1(x) = \underline{\hspace{2cm}}$	$f_2(x) = \underline{\hspace{2cm}}$
selected points that fit this image	$(-2, -8)$	$(-2, -3)$	$(-4, -8)$
	$(-1, -1)$	$(-1, 4)$	$(-3, 1)$
	$(0, 0)$	$(0, 5)$	$(-2, 0)$
	$(1, 1)$	$(1, 6)$	$(-1, -1)$
	$(2, 8)$	$(2, 13)$	$(0, -8)$



Find the function values: $f(-2)$, $f(0)$, and $f(3)$. Indicate if the function is undefined for a given value of x .

9. $f(x) = |x + 5|$



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a. $f(-2) =$

b. $f(0) =$

c. $f(3) =$

10. $f(x) = |x - 2|$

a. $f(-2) =$

b. $f(0) =$

c. $f(3) =$

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

a. $f(-2) =$

b. $f(0) =$

c. $f(3) =$

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

a. $f(-2) =$

b. $f(0) =$

c. $f(3) =$

13. $f(x) = 3^{x+2}$

a. $f(-2) =$



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b. $f(0) =$

c. $f(3) =$

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

a. $f(-2) =$

b. $f(0) =$

c. $f(3) =$

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

a. $f(-2) =$

b. $f(0) =$

c. $f(3) =$

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

a. $f(-2) =$

b. $f(0) =$

c. $f(3) =$

17. $f(x) = \frac{x}{(x+2)} - 5$

a. $f(-2) =$



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b. $f(0) =$

c. $f(3) =$

18. $f(x) = \log_3 x$

a. $f(-2) =$

b. $f(0) =$

c. $f(3) =$

19. $f(x) = \log_7 (7)^x$

a. $f(-2) =$

b. $f(0) =$

c. $f(3) =$

20. $f(x) = x \log_{10} 1,000$

a. $f(-2) =$

b. $f(0) =$

c. $f(3) =$