

	NOTATION	$f(x) = -2(x+7)^2 - 3$	$g(x) = 2(x+3) - 7$	$h(x) = -3(x+2)^3 - 7$
DOMAIN	INEQUALITY	$-\infty < x < \infty$		
	INTERVAL	$(-\infty, \infty)$		
	SET BUILDER	$\{x \mid x \in \mathbb{R}\}$		
RANGE	INEQUALITY	$-\infty < f(x) \leq -3$	$-\infty < g(x) < \infty$	$-\infty < h(x) < \infty$
	INTERVAL	$(-\infty, -3]$	$(-\infty, \infty)$	$(-\infty, \infty)$
	SET BUILDER	$\{f(x) \mid f(x) \leq -3\}$	$\{g(x) \mid g(x) \in \mathbb{R}\}$	$\{h(x) \mid h(x) \in \mathbb{R}\}$

The domains of all three of these functions contain all real numbers because the functions are polynomials, $g(x)$ having degree one, $f(x)$ having degree two, and $h(x)$ having degree three. The ranges of $g(x)$ and $h(x)$ contain all real numbers since $g(x)$ is a linear function and $h(x)$ is a cubic function. The range of the quadratic function $f(x)$ does not contain all real numbers but is restricted to only those real numbers less than or equal to the value of its parameter d , negative three, since the fact that its parameter a is negative indicates that the parabola opens downward.



YOU TRY IT! #4

Identify and compare the domains and ranges of $f(x) = \frac{1}{2}(x-4)^3 + 5$, $g(x) = \frac{1}{2}(x-4) + 5$, and $h(x) = \frac{1}{2}(x-4)^2 + 5$. Write the domain and range of each function as inequalities, as intervals, and in set builder notation.



PRACTICE/HOMEWORK

For questions 1 - 8, describe the transformation of the cubic parent function, $f(x) = x^3$ that will result in the graph of the cubic function given.

1. $h(x) = (2x - 1)^3$

2. $g(x) = -3(x)^3 + 4$

3. $h(x) = 2(x + 2)^3$

4. $g(x) = (-\frac{1}{4}x + 2)^3 + 5$

5. $h(x) = -\frac{3}{4}(x - 6)^3 + 3$

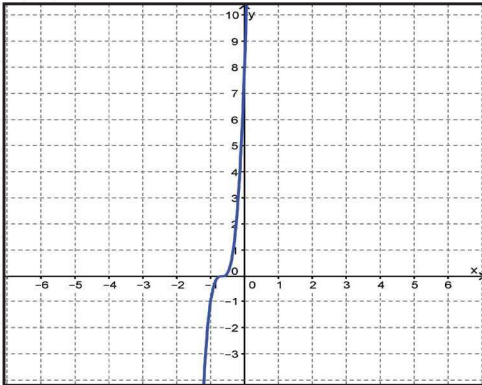
6. $g(x) = \frac{1}{2}(4x + 3)^3 - 2$

7. $h(x) = -3(\frac{1}{4}x - 1)^3 + 5$

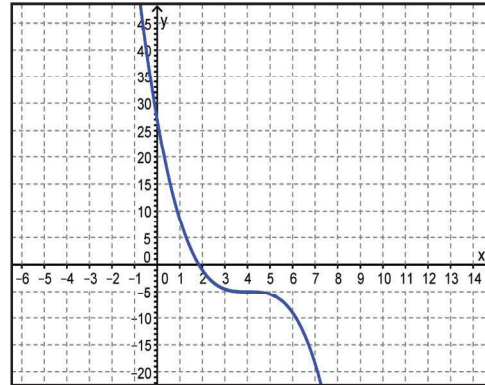
8. $g(x) = -(-6x + 5)^3 - 3$

For questions 9 - 11, identify the key attributes, including its domain, range, x -intercept(s), and y -intercepts of the linear function described by the equation and the graph. Write the domain and range as inequalities and in set builder notation.

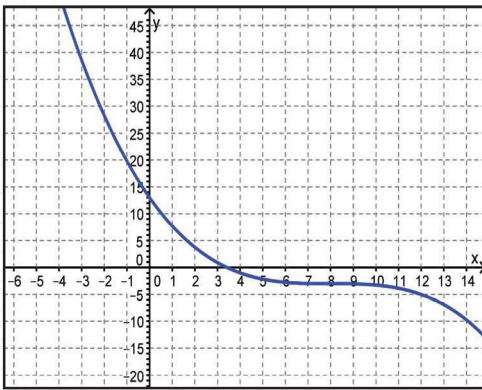
9. $f(x) = (3x + 2)^3$



10. $f(x) = -\frac{1}{2}(x - 4)^3 - 5$

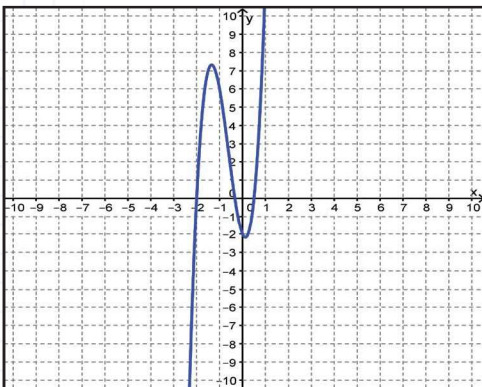


11. $f(x) = 2(-\frac{1}{4}x + 2)^3 - 3$

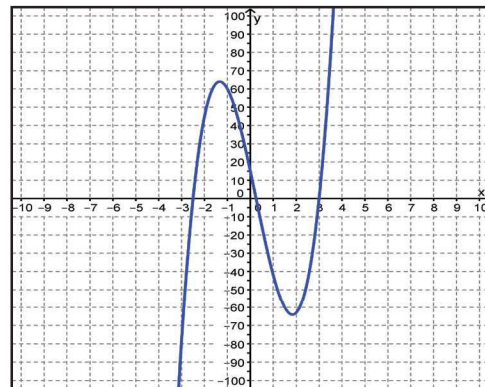


For questions 12 - 14, identify the key attributes, including its domain, range, relative minimum, relative maximum, x -intercept(s), and y -intercepts of the linear function described by the equation and the graph. Write the domain and range as intervals. Use graphing technology to determine the relative minimum, relative maximum, and x -intercepts.

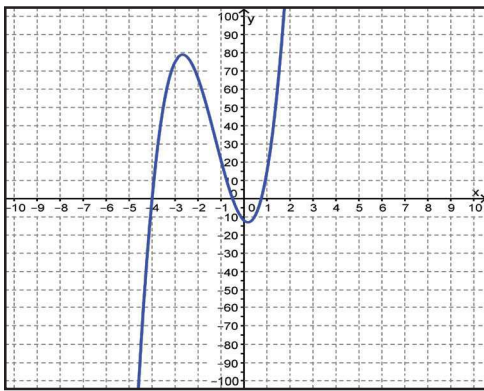
12. $f(x) = (x + 2)(2x - 1)(3x + 1)$



13. $f(x) = (2x + 5)(x - 3)(4x - 1)$



14. $f(x) = (4x - 3)(2x + 1)(x + 4)$



For questions 15 - 17, identify and compare the x -intercepts and the y -intercepts of the functions.

15. $f(x) = \frac{1}{2}(x - 4)$

$g(x) = \frac{1}{2}(x - 4)^2$

$h(x) = \frac{1}{2}(x - 4)^3$

16. $f(x) = -2(x + 3) + 5$

$g(x) = -2(x + 3)^2 + 5$

$h(x) = -2(x + 3)^3 + 5$

17. $f(x) = -3(2x + 5) + 9$

$g(x) = -3(2x + 5)^2 + 9$

$h(x) = -3(2x + 5)^3 + 9$

For questions 18 - 20, complete the table to write the domain and range of each function as inequalities, as intervals, and in set builder notation.

18. $f(x) = (2x + 3) - 6$

$g(x) = (2x + 3)^2 - 6$

$h(x) = (2x + 3)^3 - 6$

		NOTATION	$f(x) = (2x + 3) - 6$	$g(x) = (2x + 3)^2 - 6$	$h(x) = (2x + 3)^3 - 6$
DOMAIN	INEQUALITY				
	INTERVAL				
	SET BUILDER				
RANGE	INEQUALITY				
	INTERVAL				
	SET BUILDER				