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Instructor: UVIC Math	**Book:** Thomas' Calculus Early Transcendentals, 14e
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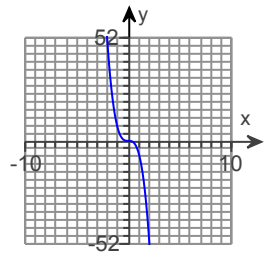
Graph the function. What symmetries, if any, does the graph have? Specify the open intervals over which the function is increasing and the open intervals where it is decreasing.

$y = -6x^3$

To graph the function, first make a table of xy-pairs that satisfy the equation. Select several values of x and substitute them into the equation to find the corresponding y-values. Find y for each of the x-values below.

x	$y = -6x^3$
−2	48
−1	6
0	0
1	−6
2	−48

Plot the points and draw a smooth curve through the points. The graph of the function $y = -6x^3$ is shown to the right.

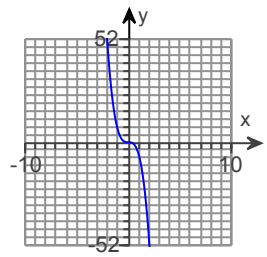


To determine whether the graph is symmetric, first recall the definitions of symmetry of a graph.

A graph is symmetric about the y-axis if, for every point (x,y) lying on the graph, the point $(-x,y)$ also lies on the graph. A graph is symmetric about the origin if, for every point (x,y) lying on the graph, the point $(-x,-y)$ also lies on the graph.

Equivalently, a graph is symmetric about the y-axis if a reflection across the y-axis leaves the graph unchanged, and a graph is symmetric about the origin if a rotation of 180° about the origin leaves the graph unchanged.

Observe the graph of $y = -6x^3$. Notice that a point (x,y) lies on the graph if and only if the point $(-x,-y)$ lies on the graph. Equivalently, a rotation of 180° about the origin leaves the graph unchanged. Thus, the graph of $y = -6x^3$ is symmetric about the origin.



If the graph of a function climbs or rises from left to right, then the function is increasing. If the graph descends or falls from left to right, then the function is decreasing.

Notice that the graph of $y = -6x^3$ falls from left to right. Thus, the function is decreasing on the interval $(-\infty,\infty)$ and is never increasing.