Student: Arfaz Hossain	**Course:** MATH 100 (A01, A02, A03) Fall 2021
Instructor: UVIC Math	**Book:** Thomas' Calculus Early Transcendentals, 14e
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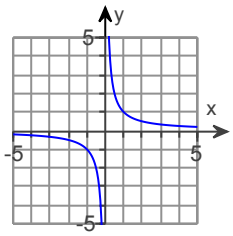
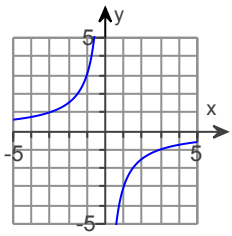
Graph the function. What symmetries, if any, does the graph have? Specify the open intervals over which the function is increasing and the open intervals where it is decreasing.

$$y = -\frac{3}{x}$$

First, look at the graph to the right of the base function $y = \frac{1}{x}$. If the function has a negative sign, the graph will be the general shape of the opposite of the graph of $y = \frac{1}{x}$. If the function does not have a negative sign, the graph will be the general shape of the graph of $y = \frac{1}{x}$.



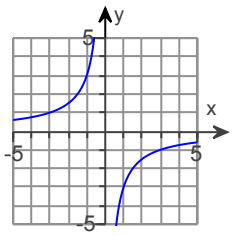
The graph of $y = -\frac{3}{x}$ is shown to the right.



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 $y = -\frac{3}{x}$. For every point (x,y) lying on the graph, the point $(-x,-y)$ also lies on the graph. This means that the graph 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 has two branches and that both branches rise from left to right. Thus, the function is increasing on $(-\infty,0)\cup(0,\infty)$ and is never decreasing. The point $x = 0$ is not in the domain, so it cannot be included to make the interval $(-\infty,\infty)$.