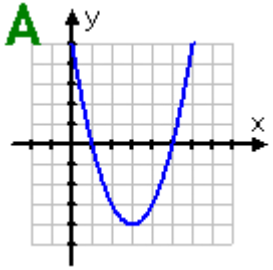
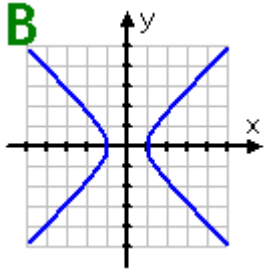
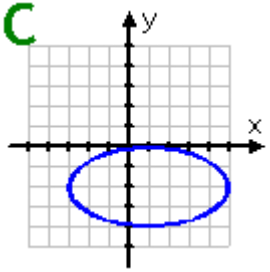
Symmetry and Graphing

For each of the following graphs, list any symmetries, and state whether the graph shows a function.



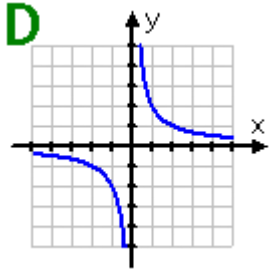


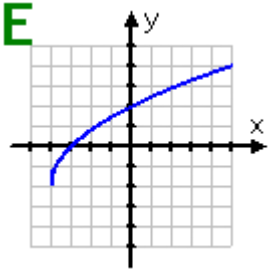


Graph A: This graph is symmetric about its axis, the line $x = 3$. There is no other symmetry. This graph shows a function.

Graph B: This graph is symmetric about the axes $x = 0$ (the y-axis) and $y = 0$ (the x-axis) and also about the origin. Since a vertical line could cross this graph twice, it does not show a function.

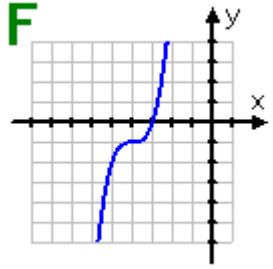
Graph C: This graph is symmetric about the axes $x = 1$ and $y = -2$, and the point $(1, -2)$. Since a vertical line can be drawn to cross the ellipse twice, this is not a function.

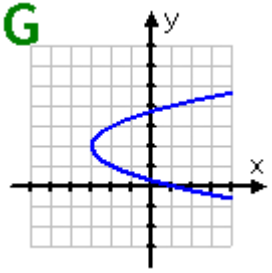


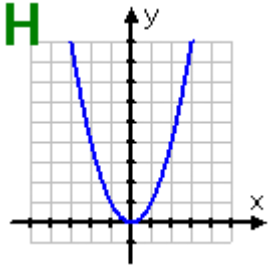


Graph D: This graph is symmetric about slanty lines: $y = x$ and $y = -x$. It is also symmetric about the origin. Because this hyperbola is angled correctly, it is a function.

Graph E: This graph (of a square-root function) shows no symmetry whatsoever, but it is a function.







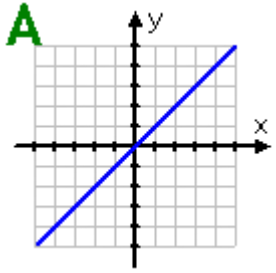
Graph F: This graph (of a cubic function) is symmetric about the point $(-4, -1)$, but not around any lines. This graph does show a function.

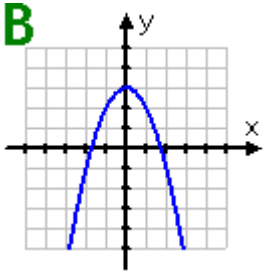
Graph G: This parabola is lying on its side. It is symmetric about the line $y = 2$. It is not a function.

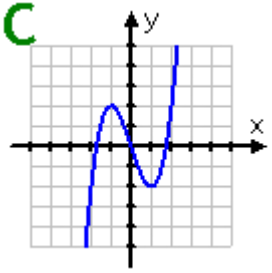
Graph H: This parabola is vertical and is symmetric about the y-axis. It is a function.

Symmetry and Graphing

Determine from the graphs whether the displayed functions are even, odd, or neither.



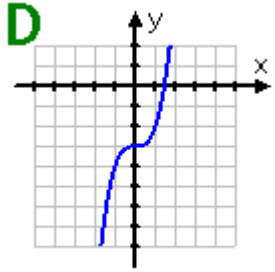


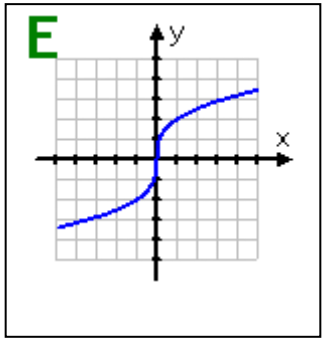


Graph A: This linear graph goes through the origin. If I rotate the graph 180° around the origin, I'll get the same picture. So this graph is ***odd.*** (The function would not be odd if the graph didn't go through the origin.)

Graph B: This parabola's vertex is on the y-axis, so the axis of symmetry is the y-axis. That means that the function is ***even.***

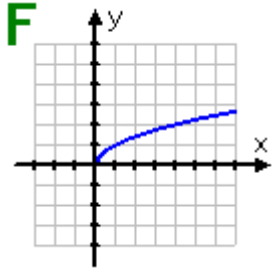
Graph C: This cubic is centered on the origin. If I rotate the graph 180° around the origin, I'll get the same picture. So this graph is ***odd.***

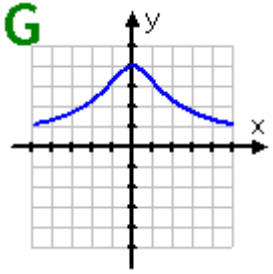


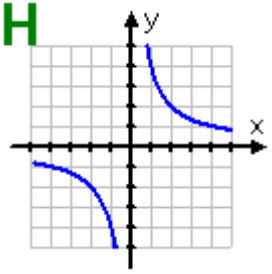


Graph D: This cubic is centered at the point $(0, -3)$. This graph is symmetric, but not about the origin or the y-axis. So this function is ***neither even nor odd.***

Graph E: This cube root is centered on the origin, so this function is ***odd.***







Graph F: This square root has no symmetry. The function is ***neither even nor odd.***

Graph G: This graph looks like a bell-shaped curve. Since it is mirrored around the y-axis, the function is ***even.***

Graph H: This hyperbola is symmetric about the lines $y = x$ and $y = -x$, but this tells me nothing about evenness or oddness. But the graph is also symmetric about the origin, so this function is ***odd.***