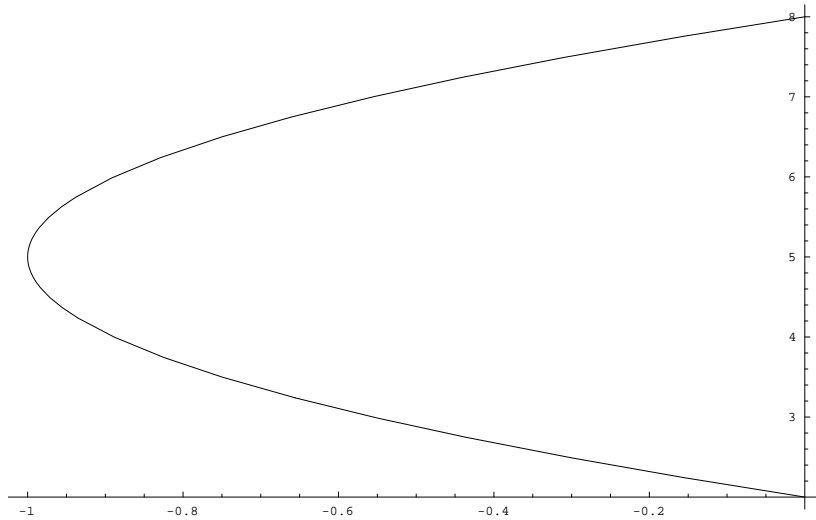


Quiz 1 Solutions

1. Draw the graph corresponding to the parametric equations $x = t^2 - 1$ and $y = 5 - 3t$, for $-1 \leq t \leq 1$. Indicate the direction of travel for a particle that moves along this path. Also, label the coordinates for the starting and ending points of the curve (that is, where $t = -1$ and where $t = 1$) as well as the points where the curve crosses either of the axes.

The curve crosses the y -axis at both the starting and ending points, at $(0, 8)$ for $t = -1$ and $(0, 2)$ for $t = 1$. Here is the graph:



The particle travels down the parabola.

2. Consider the parametric equations $x = \cos t$ and $y = t^3$, where t can be any real number. Find the equation of the tangent line to this curve at the point $\left(0, \frac{\pi^3}{8}\right)$.

The curve crosses that point at $t = \frac{\pi}{2}$. The slope of the tangent line at this point is $\left. \frac{3t^2}{-\sin t} \right|_{t=\frac{\pi}{2}} = -\frac{3\pi^2}{4}$.

So, the equation for the tangent line is $y = -\frac{3\pi^2}{4}x + \frac{\pi^3}{8}$.