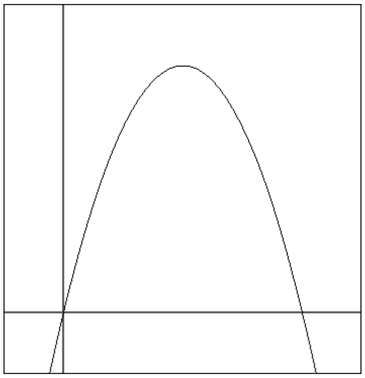
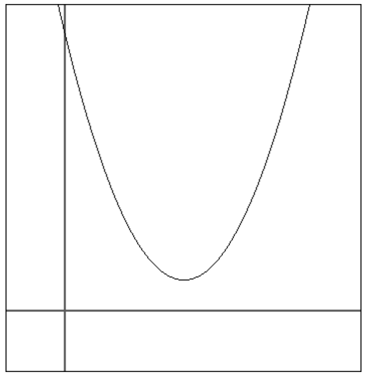
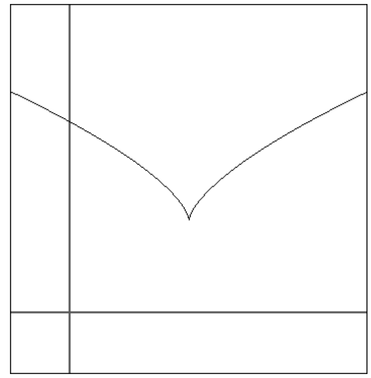
Rolle's Theorem

Let f be continuous on the closed interval $[a,b]$ and differentiable on the open interval (a,b). If $f(a) = f(b)$ then there is at least one number c in (a,b) such that $f'(c) = 0$.

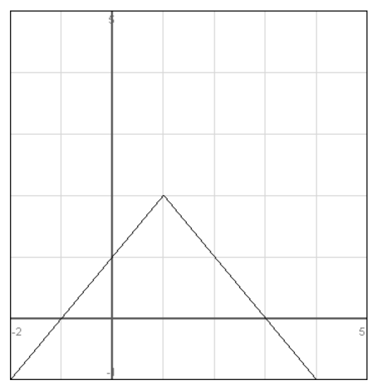




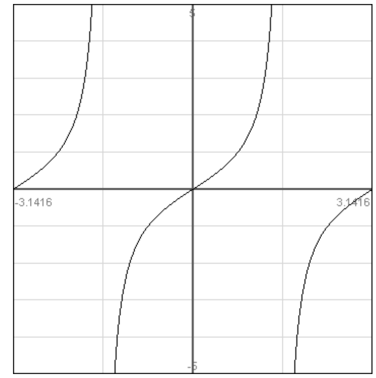


1. Explain why Rolle's Theorem does not apply on the closed interval $[a,b]$.

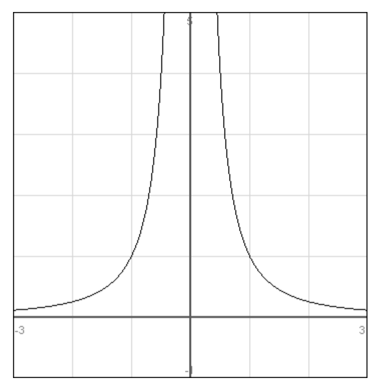
   a) $f(x) = -|x-1| + 2 \quad [-1,3]$



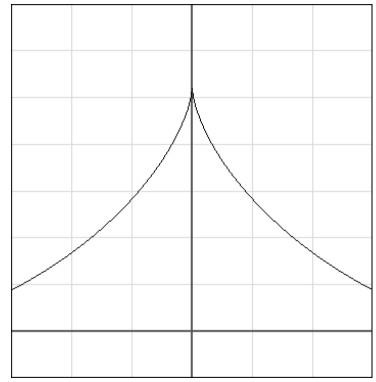
b) $f(x) = \tan x \quad [-\pi, \pi]$



c) $f(x) = \dfrac{1}{x^2} \quad [-2, 2]$

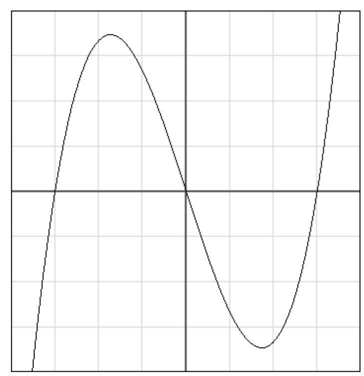


d) $f(x)=\sqrt{\left(3-x^{2/3}\right)^3}\quad [-2,2]$



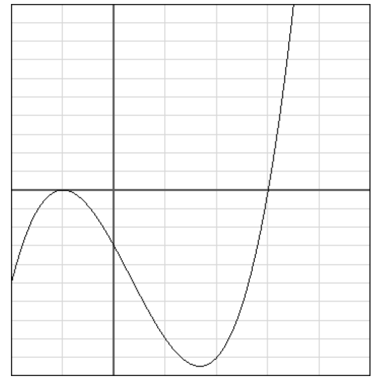
2. Find the $x-$intercepts of the function and show that $f'(x)=0$ at some point between the $x-$intercepts.

$f(x)=\dfrac{x^3}{3}-3x$

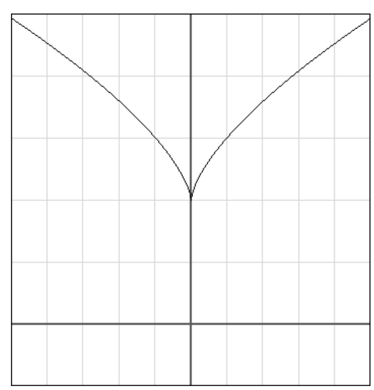


3. Determine whether Rolle's Theorem can be applied to f on the closed interval $[a,b]$. If Rolle's Theorem can be applied, find all values of c in the open interval (a,b) such that $f'(c)=0$.

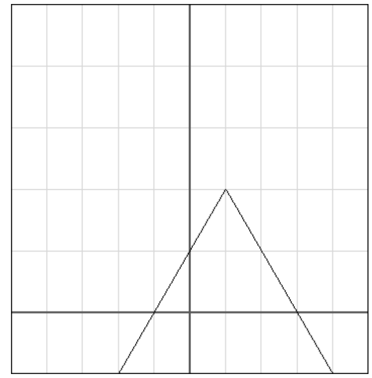
a) $f(x)=x^3-x^2-5x-3 \quad [-1,3]$



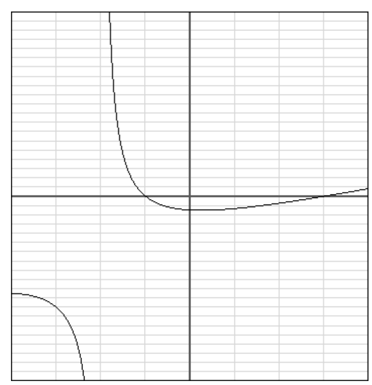
b) $f(x)=x^{2/3}+2 \quad [-4,4]$



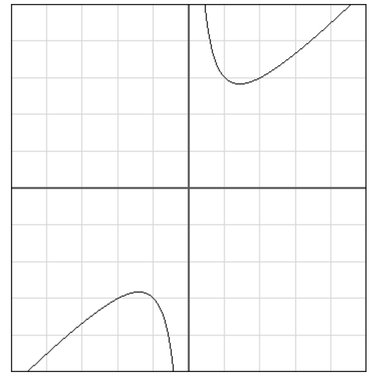
c) $f(x) = 2 - |x - 1| \qquad [-4, 4]$



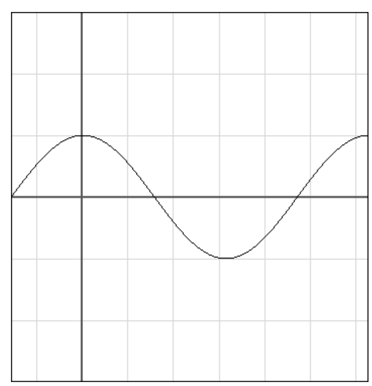
d) $f(x) = \dfrac{x^2 - 2x - 3}{x + 2} \qquad [-1, 3]$



e) $f(x) = \dfrac{x^2 + 2}{x} \qquad [-1, 1]$



f) $f(x) = \cos x \qquad [0, 2\pi]$



g) $f\left(x\right)=\sin 2x \quad \left[0,\dfrac{\pi}{2}\right]$