Exercise 26

Sketch the graph of a function f where the domain is $(-2, 2)$, $f'(0) = -2$, $\lim_{x \to 2^-} f(x) = \infty$, f is continuous at all numbers in its domain except ± 1, and f is odd.

Solution

Use the following piecewise function to satisfy the conditions.

$$f(x) = \begin{cases} -\dfrac{1}{x+2} & \text{if } -2 < x < -1 \\[2mm] -2x & \text{if } -1 < x < 1 \\[2mm] \dfrac{1}{2-x} & \text{if } 1 < x < 2 \end{cases}$$