10 Deriving from First Principles

1. If $f(x) = 2x - x^2$, show that $f'(x) = -2x + 2$.

2. Differentiate from first principles:

$$f(x) = -x^3 + 2x$$

3. If $f(x) = \sqrt{x}$, show that $f'(x) = \dfrac{1}{2\sqrt{x}}$.

4. Find the derivative function of the curve shown below by differentiating from first principles.

$$g(x) = \frac{1}{x}$$

5. Differentiate from first principles:

$$f(x) = (x + 1)(x - 9)$$