

1. Use the Definition of the Derivative to find the following derivatives.

(a) $f(x) = x^2 + x + 4$. Find $f'(x)$.

(b) $g(x) = \frac{2}{x}$. Find $g'(x)$.

(c) $h(x) = \sqrt{x^2 + 4}$. Find $h'(x)$.

2. Find the derivative of $f(x) = \frac{3}{x} + x^2$.

3. Find the derivative of $p(x) = 4x^5 - 2x^3 + x^2 - 6$.

4. Find the derivative of $f(x) = x \sin(x)$.

5. Find the derivative of $q(x) = \frac{2x + 1}{x^2 + 3x}$.

6. Show that the derivative of $y = \csc x$ is $-\csc(x) \cot(x)$. (Write it in terms of $\sin(x)$ and then take the derivative).

7. Find the derivative of $f(x) = \frac{\sin(x) \cos(x) - \cos(x)}{3x - 1}$.

8. Find the derivative of $f(x) = \sin^2(x)$.