In this worksheet, you will practice calculating derivatives directly from the limit definition.

In all of the following problems, you will need to calculate the derivative of a function using the definition:

\[
f'(x) = \lim_{h \to 0} \frac{f(x + h) - f(x)}{h}.
\]

1. Let \( f(x) = 2x^2 - x \). Calculate \( f'(3) \).
2. Find the slope of a tangent line to the curve \( y = x^3 \) at the point \((-2, -8)\).

3. Find the equation of the tangent line to the graph of \( y = \frac{1}{x} \) at the point where \( x = 3 \).
Let $f(x) = \sqrt{x}$. Calculate $f'(a)$. 
Find all the points on the graph of $y = x^2 - 2x$ where the tangent line is horizontal.