1. Let \( f(x) = x^2 - 3x \). Find \( f'(x) \) by evaluating the limit of the difference quotient
\[
\lim_{h \to 0} \frac{f(x + h) - f(x)}{h}
\]

2. Let \( f(x) = \sqrt{x} + 1 \). Find \( f'(x) \) by evaluating the limit of the difference quotient
\[
\lim_{h \to 0} \frac{f(x + h) - f(x)}{h}
\]

For the remaining problems you may compute derivatives using any of the techniques that we have learned.

3. Find all the points where the graph \( y = 2x^3 + 3x^2 - 12x + 2 \) has a horizontal tangent line.

4. Find the derivative \( f'(x) \) for each of the following functions and tell for which values of \( x \) the derivative is defined.

5. \( f(x) = x^8 - 5x^3 + 5 \).

6. \( f(x) = x^2 + \sin x + (2/x) \).

7. \( f(x) = 5\sqrt{x^3} \).

8. You are given the following information about an unknown function \( f \): the function is defined for all real numbers \( x \), its derivative exists everywhere and satisfies \( f'(x) = |x| \), and \( f(0) = 0 \). Sketch a graph of \( y = f(x) \).

9. The function \( h \) is defined as follows: \( h(x) = \frac{\sin x}{x} \) if \( x \neq 0 \) and \( h(0) = 1 \). Is \( h \) a continuous function? Why or why not?

10. An object is falling downwards with constant acceleration \( a(t) = -9.8 \) meters/sec.. Show that the velocity function must be a linear function of \( t \).