1. For the graph of the function illustrated in below determine the following:

(a) \( \lim_{x \to -3^-} f(x) \)
(b) \( \lim_{x \to -3^+} f(x) \)
(c) \( \lim_{x \to 8^-} f(x) \)
(d) \( \lim_{x \to 3^+} f(x) \)
(e) \( \lim_{x \to -\infty} f(x) \)
(f) \( \lim_{x \to \infty} f(x) \)
(g) \( f(-3) \)
(h) Is \( y = f(x) \) continuous at \( x = 3 \)?

2. Compute the following limits

(a) \( \lim_{x \to \infty} \frac{3x^2}{5x^2 + 2x - 2} \)
(b) \( \lim_{x \to 2} \frac{x^2 - 4}{x - 2} \)
(c) \( \lim_{x \to 0} \frac{(x + 1)^2 - 1}{x} \)
(d) \( \lim_{x \to 0} \frac{\sqrt{x^2 + 9} - 3}{x^2} \)

3. For a function \( y = f(x) \) give the algebraic expression for the Newton quotient at the point \( x = a \).
4. The following expressions are the derivatives of a function \( y = g(x) \) at a point \( x = b \) for various functions. In each case identify \( g(x) \) and the point \( b \). DO NOT COMPUTE THE LIMITS.

(a) \( \lim_{h \to 0} \frac{(h + 1)^2 - 1}{h} \)

(b) \( \lim_{x \to b} \frac{\sqrt{x + 9} - 3}{x - 9} \)

(c) \( \lim_{h \to 0} \frac{\sin(\frac{\pi}{2} + h) - 1}{h} \)

(d) \( \lim_{x \to 0} \frac{e^{3e^h} - 1}{h} \)

5. In the Figure below one of the graphs represents a function; the other represents its derivative. Which is which and why?

![Graphs](image)

6. For each of the functions below compute the derivative \( f'(x) \) by computing the limit of the Newton quotient:

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

NB: the above expression is the answer to a question above. DO NOT COUNT ON ME GIVING THE ANSWER ON THE TEST!

(a) \( f(x) = 3x + 2 \)

(b) \( f(x) = x^2 + 3x \)

(c) \( f(x) = \sqrt{x} \)

(d) \( f(x) = \frac{1}{x} \)

7. Give the equation of the line tangent to the curve \( y = x^2 + 3x \) at the point \( x = -3/2 \). Explain the meaning of your answer.