1) Find: \( \lim_{x \to 3} f(x) \), Justify your answer. 

2) Find: \( \lim_{x \to -2^+} f(x) \) 

3) Find: \( \lim_{x \to -\infty} \frac{2 - 9x}{6} \) 

4) Find: \( \lim_{t \to 2} \frac{t^2 + 2t - 8}{t - 2} \)
5) Find \( \lim_{h \to 0} \frac{f(x+h) - f(x)}{h} \) where \( f(x) = \sqrt{x + 3} \) (2 points)

6) Find: \( \lim_{x \to -\infty} \frac{x^2 + 2x + 3}{5x^2 + 4x} \) (1 point)

7) Let \( f(x) = \begin{cases} \sqrt{5}, & \text{if } x > 4 \\ x, & \text{if } x \leq 4 \end{cases} \). For each of the following, find the limit. If the limit does not exist, so state or use the symbol \( \pm \infty \) or \( -\infty \) where appropriate.
   (a) \( \lim_{x \to 4^+} f(x) \)
   (b) \( \lim_{x \to 4^-} f(x) \)
   (c) \( \lim_{x \to \infty} f(x) \)
   (d) \( \lim_{x \to -\infty} f(x) \)

8) Differentiate: \( g(x) = \frac{3\sqrt{x}}{x + 4} \) (1 point)
9) Find the value(s) of \( x \) for which \( f(x) = \frac{x + 2}{x^3 - 4x} \) is discontinuous. Classify the discontinuities. (2 points)

10) Find the value of \( x \) for which the curve \( y = 6x^2 + 4x - 5 \) has slope 2. (1 point)

11) If a manufacturer's average cost equation is \( \bar{c} = 500 + 15q + 0.3q^2 \), find the marginal cost function. What is the marginal cost when 10 units are produced? (2 points)

12) Find \( y' \) if \( y = \sqrt[3]{x} + 1 \) (1 point)

13) Find \( y' \) if \( y = \log_5(\sqrt{x} + 3) \) (1 point)
14) Find the equation of the tangent line to \( y = x^2 e^{3x} \) at \( x = 0 \)  

(2 points)

15) Find \( \frac{dy}{dx} \) if \( 3x^2 + 7xy + y^2 = 19 \)  

(1 point)

16) Find \( y' \) if \( y = (x + 1)^{5x} \)  

(2 points)

17) If \( f(x) = \frac{2}{x} \), find the rate of change of \( f' \).  

(2 points)