**Math 200 Review 1**

**Directions:** Organize, show, and write your work clearly.

1. Apply the limit process to find the derivative of the function.
   
   (a) \( f(x) = 4x - 2x^2 + 5 \)
   
   (b) \( g(x) = \frac{3}{x+1} \)
   
   (c) \( h(t) = 2\sqrt{t} - 3 \)

2. Evaluate the derivative of the function.
   
   Simplify, and do not leave negative exponents in the final answer.

   (a) \( w(x) = \frac{3x^2}{4} - \frac{\sin(x)}{2} + \frac{2\cos(x)}{3} \)
   
   (b) \( f(x) = \frac{3}{x} - \frac{1}{x^2} + x \)
   
   (c) \( f(x) = 4\sqrt{x} - \frac{6}{\sqrt{x}} \)
   
   (d) \( f(x) = \frac{4x - 1}{3x - 2} \)
   
   (e) \( f(x) = \frac{x + 4}{2x^2 - 2} \)
   
   (f) \( f(x) = 3x \tan(x) \)
   
   (g) \( f(x) = x^2 \csc(x) \)
   
   (h) \( f(x) = \sqrt{x} \cos(x) \)

3. Find the slope-intercept form of the line that is tangent to the function at the indicated point \( P \).

   (a) \( f(x) = 2\sin(x), P(\pi, f(\pi)) \)
   
   (b) \( g(x) = \cot(x), P(\frac{\pi}{2}, g(\frac{\pi}{2})) \)
   
   (c) \( p(x) = 4\sec(x), P(\frac{\pi}{4}, p(\frac{\pi}{4})) \)
   
   (d) \( q(x) = 10x\sqrt{x}, P(1, q(1)) \)
   
   (e) \( S(x) = x\sqrt{x}, P(8, S(8)) \)
   
   (f) \( T(x) = \frac{2}{x+1}, P(2, T(2)) \)

4. Solve the inequality \( f'(x) > 0 \) or \( f'(x) < 0 \).

   Express your answer using the interval notation.

   (a) \( f(x) = 2x^3 - 3x^2 - 36x - 2 \)
   
   (b) \( f(x) = 6x^3 + 24x - 4x^3 + \pi^2 \)
   
   (c) \( f(x) = 6x^2 + 24x - 4x^3 \)
   
   (d) \( f(x) = x^{2/3} - x^{1/3} \)
   
   (e) \( f(x) = \frac{3}{4}x^{4/3} - \frac{1}{5}x^{5/3} \)