Hw 1.
(a) Find the average rate of change of \( g(x) = x^2 + 2x \) over the interval \([-1, 1]\).

(b) \( y = x^2 + x \) Find the equation for the tangent to the curve at the point \((1, 2)\). Write equation in the form \( y = ax + b \).

Hw 2. Find the limit or write “d.n.e.” if the limit does not exist.
(a) \( \lim_{x \to -3} \frac{x+3}{x^2+4x+3} \)
(b) \( \lim_{x \to 1} \frac{x+1}{\sqrt{x^2+8} - 3} \)

Hw 3.
Find \( f'(x) \) using the definition of the derivative. No credit for using the basic rules. \( f(x) = \frac{1}{x} \).

Hw 4.
Find the limits. They may be a number or \( \infty \) or \(-\infty\).
(a) \( \lim_{h \to 0} \frac{\tan(h)}{8h} \)
(b) \( \lim_{x \to \infty} \frac{1/(2x+3)}{1/(3x+2)} \)
(c) Use the pinching (sandwich) theorem to prove: \( \lim_{\theta \to \infty} \frac{\cos \theta}{\theta} = 0 \)

Hw 5.
Find the limit. If it does not exist, write either \( \infty \) or \(-\infty\), do not write “d.n.e.” \( \lim_{x \to -2} \sqrt{x+2} \)

Hw 6.
Graph \( y = \frac{2x^2}{x^2-1} \). Also draw the asymptotes and label them with their equations. Label the zeros (roots).

Hw 7.
Prove that the equation \( \cos x = -x \) has a solution in \([-\pi/2, 0]\). Use the Fixed Point Theorem or the Graph Intersection Theorem.

Hw 8.
What is the rate of change of the volume of a ball \( V = \frac{4}{3} \pi r^3 \) with respect to the radius if the radius is \( r = 2 \)?

Hw 9.
Suppose \( f(x) \) is the function whose graph is the \( y = \sqrt{x} \). Draw the graph of \( f'(x) \). Draw by plotting slopes rather than by calculating the derivative.