Math 131 - Quiz 2
August 26, 2026

Name Key

Score ______

Show all work to receive full credit. Supply explanations where necessary.

1. (4 points) Suppose that you are given the following information:

$$f(2) = 6, \qquad \lim_{x\to 2} f(x) = 3, \qquad g(2) = 9, \qquad \lim_{x\to 2} g(x) = -5.$$

Find each limit. Carefully show how you are using the limit laws.

(a) $\lim_{x\to 2} \sqrt[3]{g(x) - f(x)}$

$= \sqrt[3]{\lim_{x\to 2} g(x) - \lim_{x\to 2} f(x)} = \sqrt[3]{-5-3} = \sqrt[3]{-8} = \boxed{-2}$

(b) $\lim_{x\to 2} \left(\frac{x^2\, f(x)}{x + g(x)}\right) = \dfrac{\left(\lim_{x\to 2} x\right)^2 \left(\lim_{x\to 2} f(x)\right)}{\lim_{x\to 2} x + \lim_{x\to 2} g(x)} = \dfrac{2^2(3)}{2 + (-5)} = \dfrac{12}{-3} = \boxed{-4}$

2. (4 points) Evaluate each limit analytically.

(a) $\lim_{x\to 0} \left(\frac{x^3 + 2x^2 + 5x}{x^2 + 2x}\right)$

0/0 More work

$= \lim_{x\to 0} \dfrac{\cancel{x}(x^2+2x+5)}{\cancel{x}(x+2)} = \boxed{\dfrac{5}{2}}$

(b) $\lim_{x\to 2} \left(\frac{x^2 + x - 6}{x^3 - x^2 - 2x}\right)$

0/0 More work

$= \lim_{x\to 2} \dfrac{\cancel{(x-2)}(x+3)}{x\cancel{(x-2)}(x+1)} = \dfrac{5}{2(3)} = \boxed{\dfrac{5}{6}}$

3. (2 points) Explain why neither the limit laws nor direct substitution can be used to evaluate each limit.

(a) $\lim_{x\to \pi/2} \left(\frac{\tan x}{\sin x}\right)$

TAN $\frac{\pi}{2}$ IS NOT DEFINED.

AND FURTHERMORE, $\lim_{x\to \frac{\pi}{2}}$ TAN X DNE.

(b) $\lim_{x\to 1} \sqrt{1-x}$

$\sqrt{1-x}$ IS NOT DEFINED WHEN $X > 1$,

SO OUR FUNCTION IS NOT DEFINED

ON BOTH SIDES OF THE LIMIT POINT.