"All the rain in the sky can’t put out your fire. Of all the stars out tonight, you shine brighter."

**Problem 1.** Circle True or False. (1pt each)

(a) \( \text{True or False} \) If \( \lim_{x \to 0} f(x) \) and \( \lim_{x \to 0} g(x) \) does not exist, then \( \lim_{x \to 0} (f(x) + g(x)) \) also does not exist.

(b) \( \text{True or False} \) If \( \lim_{x \to 0} f(x) \) and \( \lim_{x \to 0} g(x) \) does exist and are finite, then \( \lim_{x \to 0} (f(x) + g(x)) \) also does exist.

(c) \( \text{True or False} \) If \( f \) is continuous at 0, then \( |f| \) is also continuous at 0.

(d) \( \text{True or False} \) If \( |f| \) is continuous at 0, then \( f \) is also continuous at 0.

**Problem 2.** Find the following limits [it may not exist] (3pts each):

(a) \( \lim_{x \to 1} \left[ \frac{1}{x - 1} + \frac{1}{x^2 - 3x + 2} \right] \)

(b) \( \lim_{x \to 1} \frac{(x - 2)^2 + 1}{x - 1} \)
(c) \( \lim_{x \to 2} \frac{\sqrt{x + 2} - x}{x^2 - 4} \)

Problem 3. Prove \( \lim_{x \to 1} 3x^3 = 3 \). (5pts)