Math330 HW7 (Fall 2020)

Professor Youngjoon Hong   Due Date: Nov. 04 (11:59 pm)

For exercise 1 to 5, use the formal definition to prove the given limits

Problem 1
$$\lim_{x \to 1/3+} \sqrt{\frac{3x-1}{2}} = 0.$$

Problem 2
$$\lim_{x \to 4} \frac{x^2 - 2x - 8}{x - 4} = 6.$$

Problem 3

$$\lim_{x \to 2/3+} \frac{5}{3x - 2} = \infty, \qquad \lim_{x \to 2/3-} \frac{5}{3x - 2} = -\infty.$$

Problem 4

$$\lim_{x\to\infty} \frac{5x+2}{2x+1} = \frac{5}{2}.$$

Problem 5

$$\lim_{x\to\infty} \sqrt{2x^2-1} = \infty.$$

Problem 6 *Assume that* $\lim_{x \to x_0} f(x) = L$ *(finite) or* $\lim_{x \to x_0} f(x) = \infty$, *and* $\lim_{x \to x_0} g(x) = \infty$. *Show that*

$$\lim_{x \to x_0} \left(f(x) + g(x) \right) = \infty.$$