

Name: \_\_\_\_\_ / 25

There are 25 points possible on this quiz. No aids (book, calculator, etc.) are permitted. Show all work for full credit.

1. [5 points] Evaluate the limit. Show work and use proper limit notation for full credit.

$$\lim_{x \rightarrow -5} \frac{x+5}{x^2+7x+10}$$

2. [5 points] Evaluate the limit. Show work and use proper limit notation for full credit.

$$\lim_{x \rightarrow 0} \frac{2 - \sqrt{4+h}}{h}$$

3. [4 points]

- a. Why is the following not a true statement?:

$$\frac{2x^2 - 3x}{x} = 2x - 3$$

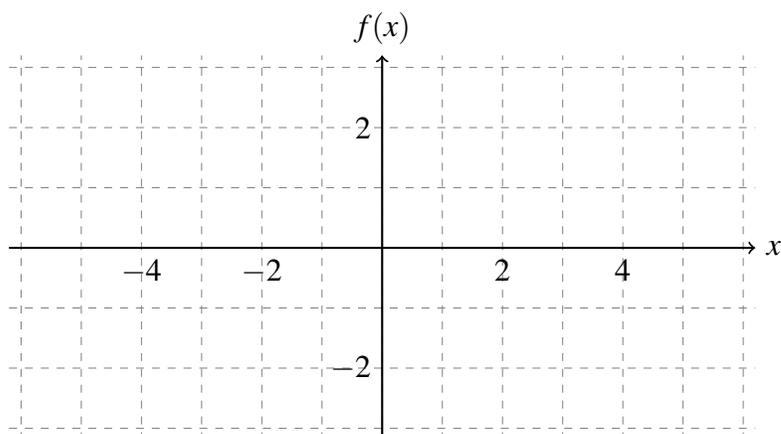
- b. Explain why the following equation *is* correct:

$$\lim_{x \rightarrow 0} \frac{2x^2 - 3x}{x} = \lim_{x \rightarrow 0} 2x - 3$$

4. [6 points] Consider the function

$$f(x) = \begin{cases} 2x + 1 & x < 0 \\ -1 + x & x \geq 0 \end{cases}$$

a. On the axes below, sketch a graph of  $f(x)$ .



b. Evaluate the limit, or explain why it does not exist:

$$\lim_{x \rightarrow 0} f(x)$$

c. Is  $f$  continuous at  $x = 0$ ? Explain using the definition of continuity.

5. [5 points] Use the Intermediate Value Theorem to justify the claim that there exists a number  $x$  on the interval  $(0, 1)$  satisfying  $e^x - 6x = 0$ .