

## Quiz 10 Solution

October 30, 2017

1. (2 points) Evaluate the following limits:

$$(a) \lim_{x \rightarrow \infty} \frac{5x^2 - 4x + 372}{\pi x^2 + 3x - 4}$$

$$\text{Solution: } \lim_{x \rightarrow \infty} \frac{5x^2 - 4x + 372}{\pi x^2 + 3x - 4} = \lim_{x \rightarrow \infty} \frac{5x^2}{\pi x^2} = \frac{5}{\pi}$$

$$\text{Answer: } \frac{5}{\pi}$$

$$(b) \lim_{x \rightarrow -\infty} \frac{x^3 - x}{5x^2 + e}$$

$$\text{Solution: } \lim_{x \rightarrow -\infty} \frac{x^3 - x}{5x^2 + e} = \lim_{x \rightarrow -\infty} \frac{x^3}{5x^2} = \lim_{x \rightarrow -\infty} \frac{x}{5} = -\infty$$

$$\text{Answer: } -\infty$$

2. (2 points) Sketch a single graph of a function  $f(x)$  that satisfies all of the following conditions:

- $x$ -intercept of  $(1, 0)$
- $y$ -intercept of  $(0, 4)$
- slant asymptote of  $y = x + 2$
- vertical asymptotes of  $x = -1$  and  $x = 2$
- $f'(x) > 0$  on  $(-\infty, -2) \cup (3, \infty)$
- $f'(x) < 0$  on  $(-2, -1) \cup (-1, 2) \cup (2, 3)$
- $f''(x) > 0$  on  $(-1, 1) \cup (2, 3)$
- $f''(x) < 0$  on  $(\infty, -1) \cup (1, 2) \cup (3, \infty)$

