Recitation #5 - 2.4 Infinite Limits and 2.5 Limits at Infinity

Warm up:

Come up with your own example of a limit of a function $f(x)$, as x approaches 4, that will be of the following form:

(a) Limit is of the form $\frac{0}{0}$ and the limit exists as a finite number.

(b) Limit is of the form $\frac{0}{0}$ and the limit is infinite.

(c) Limit is infinite and approaches positive infinity from both sides of 4.

(d) Limit does not exist (DNE), but approaches positive infinity from the left side of 4 and negative infinity from the right side of 4.

Group work:

Problem 1 *Determine the following limits:*

(a) $\lim_{x\to 3} \dfrac{x^2-3}{x^2-x-6}$

(b) $\lim_{x\to 1} \dfrac{4-x}{x^2-2x+1}$

Problem 2 *Use the Squeeze Theorem to determine the value of* $\lim_{x\to 0} x\cos\left(\dfrac{1}{x}\right)$

Problem 3 *Find any vertical or horizontal asymptotes for the given function. Be sure to tell where the function crosses its horizontal or vertical asymptote. Also, when finding vertical asymptotes, be sure to say how the function approaches the asymptote on each side:*

(a) $f(x) = \dfrac{\sqrt{2x^2+1}}{3x-5}$

(b) $f(x) = \dfrac{x^2+7x+11}{x-3}$
