NAME: _____ **Panther ID:** _____

Worksheet 01/17/2017 - MAC 2311

1. Find the following limits, provided they exist.

(a) $\lim_{x\to 0} \dfrac{3x - x^2}{x^2 - 4x + 3}$

(b) $\lim_{x\to 3} \dfrac{3x - x^2}{x^2 - 4x + 3}$

(c) $\lim_{x\to 1^-} \dfrac{3x - x^2}{x^2 - 4x + 3}$

(d) $\lim_{x\to 1^+} \dfrac{3x - x^2}{x^2 - 4x + 3}$

(e) $\lim_{x\to +\infty} \dfrac{3x - x^2}{x^2 - 4x + 3}$

(f) $\lim_{x\to -\infty} \dfrac{3x - x^2}{x^2 - 4x + 3}$

2. Find the following limits, provided they exist:

(a) $\lim_{x \to -1} \dfrac{\sqrt{x^2 + 8} - 3}{x + 1}$

(b) $\lim_{x \to 2} \dfrac{8 - x^3}{x^3 - 5x + 2}$

3. Find the following limits, provided they exist:

(a) $\lim_{x \to +\infty} \dfrac{2x}{\sqrt{9x^2+4}}$

(b) $\lim_{x \to -\infty} \dfrac{2x}{\sqrt{9x^2+4}}$

Does the function $f(x) = \dfrac{2x}{\sqrt{9x^2+4}}$ have horizontal asymptotes? If yes, describe them?

4. Consider the function $f(x) = \dfrac{|x-5|}{x^2-25}$.

(a) Does this function have horizontal asymptotes? Justify your answer with limits.

(b) Does this function have vertical asymptotes? Justify your answer with limits.

(c) Graph this function.