Panther ID: _____ **NAME:** _____

MAC 2311: Worksheet Aug. 30, 2016

1. For each of the following functions compute $\lim_{x\to+\infty} f(x)$ and $\lim_{x\to-\infty} f(x)$:

(a) $f(x) = 3x^3 - x^2 + 2x - 7$

(b) $f(x) = \frac{2x+1}{3x^4-2}$

(c) $f(x) = \frac{40x^5+x^2}{16x^4-2}$

(d) $f(x) = \frac{3x^7-4x^4+1}{2x^7+2x}$

(e) $f(x) = \frac{2x}{x^2+4}$

Which of the functions above have horizontal asymptotes and what are the asymptotes?

2. Find the following limits, provided they exist:

$$\lim_{x\to+\infty} \frac{2x}{\sqrt{x^2+4}} \qquad\qquad \lim_{x\to-\infty} \frac{2x}{\sqrt{x^2+4}}$$

Does the function $f(x) = \dfrac{2x}{\sqrt{x^2+4}}$ have horizontal asymptote(s)? If yes, write the equation(s).

3. Consider the function $f(x) = \frac{3-x}{x^2-9}$.

(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.