10-3 Notes Limits at Infinity Name _____
Pre-Calculus

I. Limits at Infinity

Find

$$\lim_{x\to\infty}\frac{1}{x}$$

$$\lim_{x\to-\infty}\frac{1}{x}$$

So we get a rule to remember. If k is any positive integer, then:

$$\lim_{x\to\infty}\frac{1}{x^k}=0 \qquad \textit{and} \qquad \lim_{x\to-\infty}\frac{1}{x^k}=0$$

Evaluate.

1. $\lim_{x\to\infty}\frac{3x^2-x-2}{5x^2+4x+1}$

BOBO BOTN EATSDC can be applied

2. $\lim_{x\to-\infty} e^x$

3. $\lim_{x\to\infty}\sin x$

II. Limits of a Sequence

In Unit 9 we studied sequences: $a_1, a_2, a_3, \ldots . a_n,$. Using limits we can determine the behavior of a sequence as n becomes large.

Recall: Convergent is when things come together from different directions so they eventually meet. Divergent is when things separate and go in different directions. Well, in sequences the term a_n may converge by approaching a number or it may not …

1. Find the limit of the sequence.

$$\lim_{n\to\infty}\frac{n}{n+1}$$

2. Converge or Diverge?

$$a_n=(-1)^n$$

3. Find the limit of the sequence given.

$$a_n=\frac{15}{n^3}\left[\frac{n(n+1)(2n+1)}{6}\right]$$