Calculus Section 9.4 Limit Comparison Test
-Use the limit comparison test to determine convergence or divergence.

Homework: page 616 #’s
13 – 21 odd, 23 – 30 (omit 28)

Some series closely resemble others but you are unable to apply the Direct Comparison Test. If this is the case, there is a second comparison test called the Limit Comparison Test.

 is a good example where direct comparison will not work but limit comparison will.

**Limit Comparison Test**Suppose that an > 0, bn > 0, and


where L is *finite and positive*. Then the two series ∑an and ∑bn either both converge or both diverge.
(further clarification: if L is finite and positive, then L cannot equal zero and L cannot equal infinity)

**Choosing what to compare:**

$$\sum\_{n=1}^{\infty }\frac{1}{2^{n}-1}$$

$$\sum\_{n=1}^{\infty }\frac{n^{2}}{\sqrt{3n-2}}$$

$$\sum\_{n=1}^{\infty }\frac{1}{\sqrt{3n-2}}$$

$$\sum\_{n=1}^{\infty }\frac{1}{3n^{2}-4n+5}$$

**Example) Determine the convergence or divergence of the following series**

1)

$$\sum\_{n=1}^{\infty }\frac{\sqrt{n}}{n^{2}+1}$$

2)

$$\sum\_{n=1}^{\infty }\frac{n2^{n}}{4n^{3}+1}$$

$$\sum\_{n=2}^{\infty }\frac{1}{\sqrt[3]{n^{2}-2}}$$

3)