Calculus Section 8.8 Improper Integrals (Infinite Limits)  
-Evaluate an improper integral that has an infinite limit of integration  
-Evaluate an improper integral that has an infinite discontinuity

Homework: page 575 #’s 17 – 27 odd, 31, 71

The definition of a definite integral  requires that the interval [a, b] be finite. Furthermore, the Fundamental Theorem of Calculus requires that *f* be continuous on [a, b]. We use **improper integrals** to get around both problems by using limits to artificially set the limits of integration to be definite.

**Definition of Improper Integrals with Infinite Integration Limits**1) If *f* is continuous on the interval [a, ), then   
2) If *f* is continuous on the interval (-, b], then  
3) If *f* is continuous on the interval (-,), then  where c is any real number.

An integral is said to **converge** if the integral equates to a finite value. An integral **diverges** if it equals infinity or cannot be determined.

**Example) An Improper Integral that Diverges Example) An Improper Integral that Converges**Evaluate  Evaluate

**Example) Example) Using L’Hôpital’s Rule**Evaluate  Evaluate 

**Example) Infinite Upper and Lower Limits of Integration**Evaluate 