

## Improper Integrals

Integral with undefined/infinite limits of integration (bounds)

$$\int_a^{\infty} f(x) dx = \lim_{R \rightarrow \infty} \int_a^R f(x) dx$$

$$\int_{-\infty}^b f(x) dx = \lim_{R \rightarrow -\infty} \int_R^b f(x) dx$$

$$\int_1^3 \frac{1}{\sqrt{3-x}} dx = \lim_{R \rightarrow 3^-} \int_1^R \frac{1}{\sqrt{3-x}} dx$$

Converge

If the limit exists  
the integral converges  
to the value of the limit

Diverge

If the limit does not exist  
(DNE or  $\infty$ )

the integral diverges