DATE: _____

Improper Integrals

Find the area of the region, if possible, enclosed between $y = \frac{1}{x-2}$ and the x-axis on $1 \le x \le 3$.

Comparison Test

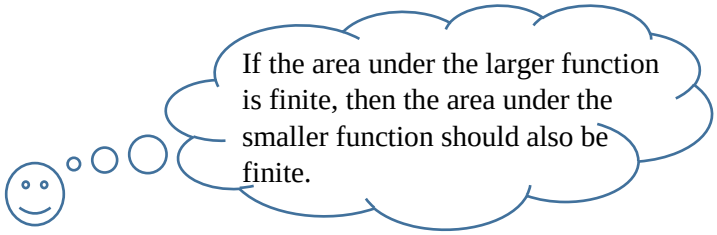
Let $f(x)$ and $g(x)$ be continuous on $[a, \infty)$ and $0 \le f(x) \le g(x), \ \forall\, x \ge a$,

If $\int_a^\infty g(x)\,dx$ converges, then $\int_a^\infty f(x)\,dx$ _____.

If $g(x) \ge f(x)$ *and*

$\int_a^\infty g(x)\,dx$ converges,

then $\int_a^\infty f(x)\,dx$ also converges.

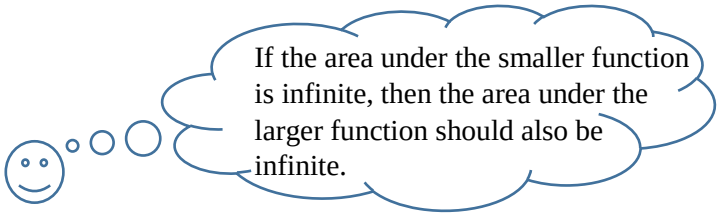


If $\int_a^\infty f(x)\,dx$ diverges, then $\int_a^\infty g(x)\,dx$ _____.

If $f(x) \le g(x)$ *and*

$\int_a^\infty f(x)\,dx$ diverges,

then $\int_a^\infty g(x)\,dx$ also diverges.



Example 1:

$\int_1^{\infty} \frac{dx}{x^2+3}$

Example 2:

$\int_3^{\infty} \frac{2x+1}{(x+1)^2} dx$

Example 3:

$\int_1^{\infty} \frac{x}{x^4+2x^2}\,dx$

Example 4:

$\int_1^{\infty} \frac{\sin x+3}{\sqrt{x}}\,dx$