## Section 7.8: Trigonometric Integrals

**TYPE 2 Improper Integrals are of the form**

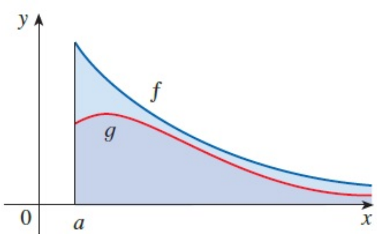
$$\int_a^b f(x)\,\mathrm{dx},$$

**where the function $f$ has <u>any</u> kind of discontinuity over the finite interval $[\mathbf{a}, \mathbf{b}]$.**

**Problem 2.** Determine whether the integral is convergent or divergent. Evaluate the integrals thst are convergent.

(a) $\displaystyle\int_0^{\pi/2} \frac{\cos(\theta)}{\sqrt{\sin(\theta)}}\,\mathrm{d}\theta,$ (b) $\displaystyle\int_0^1 r\ln(r)\,\mathrm{dr}.$

**Using the Comparison Theorem**




**Comparison Theorem** Suppose that $f$ and $g$ are continuous functions with $f(x) \geqslant g(x) \geqslant 0$ for $x \geqslant a$.

(a) If $\int_a^\infty f(x)\,dx$ is convergent, then $\int_a^\infty g(x)\,dx$ is convergent.

(b) If $\int_a^\infty g(x)\,dx$ is divergent, then $\int_a^\infty f(x)\,dx$ is divergent.

**Problem 3.** Use the Comparison Theorem to determine whether the integral is convergent or divergent. **You do not have to evaluate the integral.**

(a) $\displaystyle\int_1^\infty \frac{1+\sin^2(x)}{\sqrt{x}}\,\mathrm{d}\theta,$ (b) $\displaystyle\int_1^\infty \frac{x+1}{\sqrt{x^4-x}}\,\mathrm{dx}$ **Hint:** "Split" the integral at $x = 2$.