Quiz Review $\int_0^{\infty} \frac{1}{\sqrt{1+x}}\,dx$ see solutions.

Integration: $\int x^3\,dx = \frac{1}{4}x^4 + C = \frac{x^4}{4} + C$

$$\int \sqrt{x}\,dx = \int x^{1/2}\,dx = \frac{2}{3}x^{3/2} + C = \frac{x^{3/2}}{3/2} + C$$

$$\int \frac{1}{x^3}\,dx = \int x^{-3}\,dx = \frac{-1}{2}\cdot x^{-2} + C = \frac{x^{-2}}{-2} + C$$

$$\int \frac{1}{\sqrt{x}}\,dx = \int x^{-1/2}\,dx = 2\cdot x^{1/2} + C = \frac{x^{1/2}}{1/2} + C$$

Evaluating limits: $\lim_{t\to\infty} t^2 + 3 = \infty$ divergent.

$\lim_{t\to\infty} \frac{1}{t^2+3} = \frac{1}{\infty} = 0$ convergent.

$\lim_{t\to\infty} \sqrt{t} = \infty$ divergent.

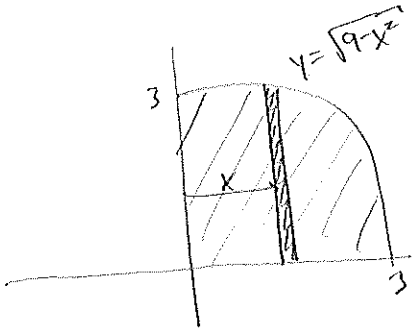
$\lim_{t\to\infty} \frac{1}{\sqrt{t}} = \frac{1}{\infty} = 0$ convergent.

$\lim_{t\to\infty} \frac{1}{t} + 3 = \frac{1}{\infty} + 3 = 3$ convergent.

$\lim_{t\to\infty} \ln(t) = \infty$ divergent.

see solutions Quiz #2 arc length

Volume of Sphere via cylindrical shells $(r = 3)$



$$2\int_0^3 2\pi x \cdot \sqrt{9-x^2}\, dx$$

$u = 9-x^2$

$du = -2x\,dx$

$\frac{du}{-2} = x\,dx$

$$= -\frac{2}{2}\int_0^3 2\pi \sqrt{u}\, du$$

$$= -2\pi \frac{2}{3} u^{3/2}\Big|_{x=0}^{x=3} = -\frac{4\pi}{3}(9-x^2)^{3/2}\Big|_{x=0}^{x=3}$$

$$= 0 - \left(-\frac{4\pi}{3}(9)^{3/2}\right) = \frac{4}{3}\pi(3)^3$$