$$P(A) = \frac{\int_c^d f(x)dx}{\int_a^b f(x)dx} = \int_c^d f(x)dx$$

$$Note: \int_a^b f(x)dx = 1$$

$$f(x) = 3x^2$$

$$[c,d] = (\frac{2}{3},1)$$

$$\int_{2/3}^{1} 3x^2\,dx = (1)^3 - (\frac{2}{3})^3 = .29$$

$$E(x) = \int_a^b xf(x)dx$$

$$= \int_0^1 x(3x^2)dx = \int_0^1 3x^3\,dx = (\frac{3}{4})(x^4)\,|_0^1 = 3/4$$

$$f(x) = \frac{1}{2}Sin(x)$$

$$x = [0,\pi]$$

$$\int_0^{\pi} \frac{1}{2}(x)Sin(x)dx = \frac{1}{2}\int_0^{\pi}(x)Sin(x)dx$$

$$u = x, du = dx$$

$$dv = Sin(x)dx, v = -Cos(x)$$

$$= \frac{1}{2}[-Cos(x)]\,|_0^{\pi} = \frac{1}{2}[-Cos(\pi) - ($$

$$f(x) = x$$

$$x = [0,1]$$

$$\int_0^n (x)2x\,dx = \int_0^n 2x^2\,dx = \frac{2x^3}{3}\,|_0^n = \frac{2n^3}{3}$$