Math 16B
Vogler
Continuous Probability Definitions

Let $f(x)$ be a probability density function for a continuous random variable , x , over the interval $a \le x \le b$.

1.) The MEAN , μ , or EXPECTED VALUE , E(x) , of x is

$$\mu = E(x) = \int_a^b x\, f(x)\ dx \quad .$$

2.) The MEDIAN , m , of x is the value m in the interval $a \le x \le b$ which satisfies

$$P(a \le x \le m) = 0.5 = 1/2$$

or

$$\int_a^m f(x)\ dx = 0.5 = 1/2 \quad .$$

3.) The VARIANCE , V(x) , of x is

$$V(x) = \int_a^b (x - \mu)^2 f(x)\ dx = \int_a^b x^2 f(x)\ dx - \mu^2 \ .$$

4.) The STANDARD DEVIATION , σ , of x is

$$\sigma = \sqrt{V(x)} \quad .$$