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* Bionomial distribution example:

① $\mu_X = \Sigma x_i P(x)$

$= 0.(.272) + 1(.575) + 2(.121)$

* continuous distribution:

$P(X = 12.7865) = \frac{1}{\infty} = 0$

$P(10 \leq X \leq 15) =$

probability density function (PDF) is an equation used to compute probabilities of Continuous random variable.

It must satisfy two properties:

① The total area under the graph of the equation must equal to 1

② The height of the graph must be greater than or equal to zero.

For all possible values of the random variable.

Normal distribution: Has a bell shaped graph.

In a normal distribution, mean = median = mode.

So the high point on the graph corresponds to the

mean μ one standard deviation away from the means $(\mu-\sigma, \mu+\sigma)$ gives us the inflection points, where the curvature of the graph changes.

Properties of a normal density curve:

(1) The normal curve is symmetric about its mean.

(2) Because mean = median = mode, the high point of the normal curve corresponds to μ.

(3) The normal curve has inflection points at $\mu-\sigma$ and $\mu+\sigma$.

(4) The area under the normal curve is equal to 1

(5) The area under the curve to the right of μ is $\frac{1}{2}$ as is the area under the curve to the left of μ.

(6) The graph approaches the horizontal axis in both direction but never touches.

(7) The empirical rule applies to the normal curve.

$$Y = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$$

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Standardizing a normal Random variable

Suppose that X is normally distributed with mean μ and standard deviation δ. Then the Random variable $Z = \frac{x-\mu}{\delta}$ is normally distributed with mean $\mu=0$, and standard deviation $\delta=1$, Z is said to have the standard normal distribution.