$X \sim N(300, 50^2)$ Q1: $P(X \le 365)$?

Wednesday, September 03, 2014 11:59 AM

analysis: $Z = \frac{X-300}{50}$. $P(X \le 365) = P\left(Z \le \frac{365-300}{50}\right)$

$\hookrightarrow X = 50Z + 300$

$= P(Z \le 1.3)$

$= 0.903$

$A \mid B$

$P(X=k+n \mid X>n)$

$$= \frac{\overset{A \,\cap\, B}{P(X = k+n; X > n)}}{\underset{B}{P(X > n)}} = \frac{\overset{A}{P(X = k+n)}}{P(X > n)}$$

$A \subseteq B$

one dice: $E[X] = 1 \cdot \frac{1}{6} + 2 \times \frac{1}{6} + \cdots 6 \times \frac{1}{6} =$

$F_{XY}(x,y) = F_X(x) \cdot F_Y(y)$

$P(AB) = P(A) \cdot P(B)$ if A, B independent

$\Downarrow \Uparrow$

$P(X \le x, Y \le y) = P(X \le x) \cdot P(Y \le y)$

$Cov(X, X) = Var(X)$

$$P(|X-\mu|<k) \geq 1-\frac{\sigma^2}{k^2} \qquad [\mu-k, \quad \mu+k]$$

Wednesday, September 03, 2014 12:50 PM

Suppose we know $X \sim N(\mu, \sigma^2)$ $\quad P(|X-\mu|<\sigma) = 0.68$

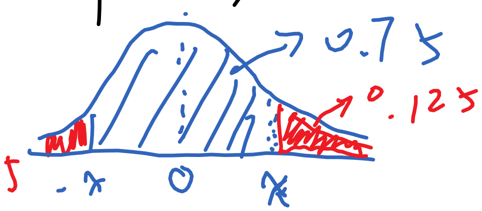
but if we donot know distr. $\quad P(|X-\mu|<\sigma) \geq 0$

75% chance of an article being between 760 and 1240 characters long

$$P(|X-\mu|<2\sigma) \geq 1-\frac{1}{4} = 3/4$$

$X \sim N(1000, 200^2)$ new question is: $P(|X-1000|<\Delta) = 0.75$

$$Z = \frac{X-1000}{200} \sim N(0,1) \qquad P\left(|Z|<\frac{\Delta}{200}\right) = 0.75$$



$P(Z<x) = 0.75+0.125$

$P(Z<1.2) = 0.875 \rightsquigarrow \Delta = 200 \times 1.2 = 240$