























Assembly Process Example

- How likely is it that the product has exactly one defect?
 - One or fewer defects?
- Recall: n = 3 k = 1 p = 0.1

$$P(X=1) = {\binom{3}{1}} 0.1^{1} (1-0.1)^{3-1} = 3(0.1)(.9)^{2} = 0.243$$

Example: Assembly Process

How likely is it that the product has one or fewer defects?

$$P(X = 1) = 0.243$$

$$P(X = 0) = {3 \choose 0} 0.1^{0} (1 - 0.1)^{3-0} = 1(1)(.9)^{3} = 0.729$$

$$P(X \le 1) = P(X = 0) + P(X = 1)$$

$$= 0.729 + 0.243 = 0.972$$



Variance of the Binomial Distribution

$$\sigma^{2} = np(1-p) = npq$$
$$\sigma = \sqrt{npq}$$

• Assembly Process:

$$\sigma^2 = 3 * 0.1(1 - 0.1) = 0.27 \text{ errors}^2$$

$$\sigma = \sqrt{0.27} \approx 0.52 \text{ errors}$$