

$(.571, .632)$

$$\begin{matrix} & & .571 \\ & \swarrow & \\ & & .6312 \\ & \searrow & \\ & & .601 \pm .0312 \end{matrix}$$

2-SIDED 95% CI for proportion

$$p \pm 2 \sqrt{\frac{p(1-p)}{n}} = .601 \pm 2 \sqrt{\frac{(.601)(.399)}{985}}$$

$$\frac{1}{2} = .399 = \frac{.985}{2.485}$$

$$p = .592 = .601$$

$$\frac{1}{2} = .399 = \frac{.985}{2.485}$$

3) $f(x; p) = (1-p)^{x-1} p$
 $L(p) = \prod_{i=1}^n f(x_i; p) = \prod_{i=1}^n (1-p)^{x_i-1} p = (1-p)^{\sum (x_i-1)} p^n$
 $\ln L(p) = \ln \left((1-p)^{\sum (x_i-1)} p^n \right) = \sum (x_i-1) \ln(1-p) + n \ln p$
 $\frac{d}{dp} \ln L(p) = \sum \frac{-1}{1-p} + \frac{n}{p} = 0$
 $0 = \frac{-1}{1-p} + \frac{n}{p} \Rightarrow p(n-1) + n(1-p) = 0$
 $0 = pn - p + n - np = n - p$
 $n - p = 0 \Rightarrow p = \frac{n}{n} = 1$
 $\therefore p = \frac{1}{15} \text{ MLE}$

1) $E(X^2) = \sum x^2 P(x) = 0 + \frac{10}{100} + \frac{10}{100} + \frac{10}{100} + \frac{10}{100} + \frac{10}{100} = \frac{50}{100} = .5$
 $\sigma^2 = 1700 - 1500 = 200$

4) $\mu = \sum x P(x) = (1)(.1) + (2)(.2) + (3)(.3) + (4)(.1) + (5)(.3) = 3.0$

1.5 → 5	1.5 → 5	2.5 → 5	3.5 → 5	4.5 → 5
1.4 → 4	1.4 → 4	2.4 → 4	3.4 → 4	
1.3 → 3	1.3 → 3	2.3 → 3		
1.2 → 2				

X	1	2	3	4	5
P(X=x)	0	1/10	2/10	3/10	4/10

2) OUTCOMES

$R(+)=R(+|CP)P(CP)+R(+|VS)P(VS)+R(+|CC)P(CC)$
 $= (.997)(.06) + (.9995)(.27) + (.897)(.13) = .9846$

1) $P(+|CP) = .997$
 $P(+|VS) = .9995$
 $P(+|CC) = .897$
 $P(CC) = .13$
 $P(CV) = .27$
 $P(CP) = .06$
 $R(C+)=R(+|CC)P(CC)+R(+|VS)P(VS)+R(+|CP)P(CP)$
 $= (.897)(.13) + (.9995)(.27) + (.997)(.06) = .9846$
 $\therefore .1184$



$$= 0.225$$

$$= \binom{0}{0} (0.1035)^0 (0.8965)^{10} + \binom{1}{0} (0.1035)^1 (0.8965)^9$$

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

⑥ $n=10$ $X=10$ PATTERNS W/ CTR \Rightarrow BLOCKING

$$= 0.1035$$

$$= \int_{0.25}^1 (y^2 - 2y^3 + y^4) dy = 30 \left(\frac{y^3}{3} - \frac{2}{4} y^4 + \frac{y^5}{5} \right) \Big|_{0.25}^1 = 30 \left(\frac{1}{3} - \frac{2}{4} + \frac{1}{5} \right) = 30 \left(\frac{1}{3} - \frac{1}{2} + \frac{1}{5} \right)$$

5) $P(Y < 0.25) = \int_{0.25}^1 30y^2(1-y)^2 dy = \int_{0.25}^1 30y^2(1-y^2) dy$