(34) 25 buses 8 with cracks

(a) $\binom{25}{5} = \frac{25!}{(5!)(20!)} = \frac{25\cdot 24\cdot 23\cdot 22\cdot 21}{5\cdot 4\cdot 3\cdot 2\cdot 1} = \underline{\underline{53130 \text{ combinations}}}$

ANS

(c) ~~b.~~ $\frac{\binom{8}{4}\binom{17}{1}}{\binom{25}{5}} = \frac{\left(\frac{8!}{(4!)(4!)}\right)\left(\frac{17!}{(1!)(16!)}\right)}{53130} = \frac{\left(\frac{8\cdot 7\cdot 6\cdot 5}{4\cdot 3\cdot 2\cdot 1}\right)(17)}{53130}$

$= \frac{(70)(17)}{53130} = \frac{1190}{53130} = 0.0224$

(b) $\binom{8}{4}\binom{17}{1} = 1190$ combinations

(d) $\frac{\binom{8}{4}\binom{17}{1}}{\binom{25}{5}} + \frac{\binom{8}{5}\binom{17}{0}}{\binom{25}{5}} = (0.0224) + \frac{\left(\frac{8\cdot 7\cdot 6}{3\cdot 2\cdot 1}\right)(1)}{53130}$

$0.0224 + \frac{56}{53130} = 0.0224 + 0.0011$

$\underline{\underline{0.0235}}$

ANS

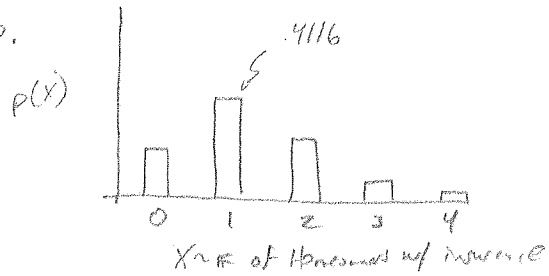
p.110 #16 $X \sim$ # of homeowners out of 4 that have insurance

S ~ yes insurance
F ~ no insurance

a.

X	actual outcome(s)	$p(x)$	
0	FFFF	$(.7)(.7)(.7)(.7)$	$= 0.2401$
1	SFFF, FSFF, FFSF, FFFS	$4\cdot(.3)(.7)^3$	$= 0.4116$
2	SSFF, SFSF, SFFS, FSSF, FFSS, FSFS	$6(.3)^2(.7)^2$	$= 0.2646$
3	SSSF, SFSS, SSFS, FSSS	$4(.3)^3(.7)$	$= 0.0756$
4	SSSS	$(.3)^4$	$= 0.0081$
			1

b.



c. Most likely value → $\underline{1}$ ans

d. $P(X \geq 2) = p(2) + p(3) + p(4) = \underline{\underline{0.3483}}$ ans

48

$X \sim$ bin $\to$ # of boards that are defective out of $n = 25$

$p(S) = 0.05$

a. $P(X \le 2) = F(2) = \underline{0.872894}$ ANS

b. $P(X \ge 5) = 1 - F(4) = \underline{0.007165}$ ANS

c. $P(1 \le x \le 4) = F(4) - p(0) = \underline{0.71549}$ ANS

d. $p(0) = \underline{0.27739}$ ANS

e. $E[X] = \sum x p(x) = np = \underline{1.25}$ ANS

$\sigma_x = \sqrt{\sum (x-\mu)^2 p(x)} = \sqrt{npq} = \underline{1.089725}$ ANS

49

a. $p(S) = 0.1 \quad n = 6 \quad P(X=1) = \binom{6}{1} \cdot 1^1 \cdot 9^5 = \underline{0.354294}$ ANS

b. $P(X \ge 2) = 1 - F(1) = \underline{0.114265}$ ANS

54

$n = 10 \quad p(S) = 0.6 \quad X \sim$ # of customers that want oversize market

a. $P(X \ge 6) = 1 - F(5) = \underline{0.633103}$ ANS

b. $P(\mu - \sigma \le x \le \mu + \sigma) \quad \mu = 10(.6) = 6 \quad \sigma = \sqrt{6(.4)} = 1.5492$

$P(4.45 \le x \le 7.5492) = P(5 \le x \le 7) = F(7) - F(4) = \underline{0.666472}$ ANS

c. $P(X \text{ is } 3, 4, 5, 6, \text{or } 7) = P(3 \le x \le 7) = F(7) - F(2) = \underline{0.820416}$ ANS

60

$X \sim$ # of passenger cars @ toll out of 25 vehicles

$Y = 1X + 2.5(n - X)$

$n = 25 \quad p(S) = 0.6$

$E[Y] = E[X + 2.5(n-X)] = E[X] + 2.5(25) - 2.5E[X]$

$= 25(.6) + 62.5 - 2.5(25)(.6)$

$= \underline{\$40}$ ANS

Ch 4 #41

$X \sim N(\mu_x = 200, \sigma_x = 30)$

$P(X \le 100) = \text{DAMAGE} = 0.000429$

$Y \sim$ # damaged payloads out of 5

$p(S) = 0.000429$

$n = 5$

$P(Y \ge 1) = 1 - p(Y = 0) = \underline{0.002143}$ ANS