Math 111 - Exam 3A - Spring 2004 - Grading Instructions

(15 pts)

(1)

x	P	xP	$x-\mu$	$(x-\mu)^2$	$(x-\mu)^2 P$
0	.1	0	-2.9	8.41	.841
1	.2	.2	-1.9	3.61	.722
2	.1	.2	-.9	.81	.081
3	.1	.3	.1	.01	.001
4	.3	1.2	1.1	1.21	.363
5	.2	1.0	2.1	4.41	.882

a. $\mu = E(X) = 2.9$ (7 pts) $\quad V = 6.157 \quad \sigma \cong 1.343$ (8 pts)

(10 pts)

(2)

75 → 5 damaged, 70 good

Select 3 $\quad P(X=2) = \dfrac{C(5,2)\,C(70,1)}{C(75,3)}$

do not need to simplify

(15 pts)

(3) Binomial $n = 6 \quad p = .3$ Use Tables

a. $P(X=2) = .324$ (3 pts)

b. $P(X \geq 2) = .324 + .185 + .060 + .010 + .001 = .580$ (4 pts)

c. $P(X \leq 2) = .324 + .303 + .118 = .745$ (4 pts)

d. $P(X > 2) = .185 + .060 + .010 + .001 = .256$ (4 pts)

(10 pts)

(4) Binomial $n = 200 \quad p = \frac{1}{3} \quad q = \frac{2}{3}$

$P(X = 90) = C(200, 90)\left(\frac{1}{3}\right)^{90}\left(\frac{2}{3}\right)^{110}$

(20 pts)

(5) Z = Standard normal

(4 pts each part)

a. $P(Z < .84) = .7995$

b. $P(Z > -1.23) = 1 - .1093 = .8907$

c. $P(-.95 < Z < .95) = .8289 - .1711 = .6578$

d. $P(1.21 < Z < 2.47) = .9932 - .8869 = .1063$

e. $P(Z > t) = .6064 \Rightarrow 1 - .6064 = .3936 \Rightarrow t = -.27$

over →

(20 pts)

(6) X normal $\mu = 120$ $\sigma = 5$ $z = \frac{x-120}{5}$

a. $P(X < 124) = P(Z < .8) = \{.7881$

b. $P(X > 118) = 1 - P(Z < -.4) = 1 - .3446 = \{.6554$

c. $P(119 < X < 127) = P(-.2 < Z < 1.4)$

$= .9192 - .4207 = \{.4985$

d. $P(x < X < 122) = P(Z < .4) - P(Z < t) = .1037$

$.6554 - P(Z < t) = .1037$

$.6554 - .1037 = P(Z < t)$

$.5517 = P(Z < t) \Rightarrow t = .13$

So $.13 = \frac{x-120}{5} \Rightarrow x - 120 = .65 \Rightarrow x = 120.65$

5 pts each part

$\frac{124-120}{5} = \frac{4}{5} = .8$

$\frac{118-120}{5} = -\frac{2}{5} = -.4$

$\frac{127-120}{5} = \frac{7}{5} = 1.4$ $\frac{119-120}{5} = -\frac{1}{5} = -.2$

$\frac{122-120}{5} = \frac{2}{5} = .4$

(10 pts)

(7) $n = 100$ $p = .1$ $q = .9$ $\mu = np = 10$ $\sigma = \sqrt{npq}$

$= \sqrt{10(.9)} = \sqrt{9} = 3$

$P(X < 12) \Rightarrow P(X < 11.5)$

$P(Z < .5) = \{.6915$

$z = \frac{x-10}{3}$

$\frac{11.5-10}{3}$

$\frac{1.5}{3} = .5$