Math/Stat 511

Homework #7

p.127

#7

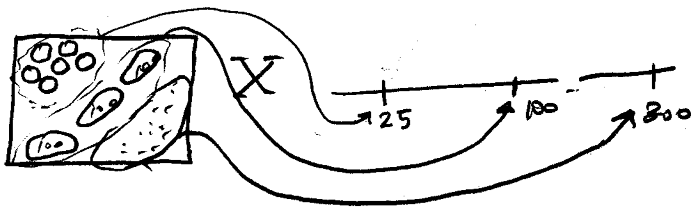
X	$f(x)$
-1	$125/216$
1	$75/216$
2	$15/216$
3	$1/216$

$\sum_{x\in S} x f(x) = (-1)\frac{125}{216} + (1)\frac{75}{216} + (2)\frac{15}{216} + (3)\frac{1}{216} = \boxed{-17/216}$

$X =$ payoff

#14 (a) average class size $= (16\cdot 25 + 3\cdot 100 + 1\cdot 300)/20 = \boxed{50}$

(b)



$X(\text{student}) =$ size of class to which they belong

x	$f(x)$
25	$400/1000$
100	$300/1000$
300	$300/1000$

(c) $\mu = E[X] = 25\left(\frac{4}{10}\right) + 100\left(\frac{3}{10}\right) + 300\left(\frac{3}{10}\right) = \boxed{130}$

You might think it would be the same as in part (a).

#15 (a)

X	$f(x)$	X^2
5	$1/5$	25
10	$1/5$	100
15	$1/5$	225
20	$1/5$	400
25	$1/5$	625

$\mu = \sum_x x f(x) = \boxed{15}$

$\sigma^2 = \sum_x x^2 f(x) - \mu^2 = \boxed{50}$

(b)

X	X^2	$f(x)$
5	25	1

$\boxed{\mu = 5}$

$\sigma^2 = 25 - 5^2 = \boxed{0}$

(c)

X	X^2	$f(x)$
1	1	$1/2$
2	4	$1/3$
3	9	$1/6$

$\boxed{\mu = 5/3}$

$\sigma^2 = \frac{3}{6} + \frac{8}{6} + \frac{9}{6} - \frac{25}{9} = \boxed{5/9}$

#21 (a)

X	X^2	$f(x)$
1	1	$1/16$
2	4	$3/16$
3	9	$5/16$
4	16	$7/16$

$\mu = \frac{25}{8}$

$\sigma^2 = 55/64$

$\sigma \doteq .9270$

(Use the computer as we've done before

X	rel. freq.
1	.
2	.
3	.
4	.

p.139

#5 (a) X Binomially distributed $n = 25$ $p = .7$ $\Rightarrow$ $\mu = np = 17.5$, $\sigma^2 = npq = 5.25$, $\sigma \approx 2.2913$

#9 (a) Must assume X is Binomially distributed with $n = 9$ & $p = .1$

(b) $\boxed{\mu = E[X] = np = .9,\ \sigma^2 = npq = .81,\ \sigma = .9}$

(c) i) $P(X=2) = P(X\geq 2) - P(X\geq 1) = .9470 - .7748 = \boxed{.1722}$

ii) $P(X\geq 2) = 1 - P(X\leq 1) = 1 - .7748 = \boxed{.2252}$

#13 Use $\left.\begin{array}{l} np = 6 \\ npq = 3.6 \end{array}\right\} \Rightarrow q = .6 \Rightarrow p = .4 \Rightarrow n = 6/.4 = 15$

$P(X=4) = \binom{15}{4}(.4)^4(.6)^{11} \doteq \boxed{.1268}$