MATH 110 – QUIZ 12 – 20 NOVEMBER 2009

Answer all of the following questions in the space provided.

1. (4 pts.) The probability distribution for the earnings in a certain game of chance are given in the table below. Here $X = earnings$ is a random variable.

k (earnings)	$Pr(X = k)$
-5	.23
-1	.32
1	.35
5	.07
10	.03

Find the probability distribution of the random variable X^2.

if $Z = X^2$ then

k_Z	$Pr(Z = k_Z)$
25	.30
1	.67
100	.03

$Z = 25$ means $X = -5$ or 5

so $Pr(Z=25) = Pr(X=-5) + Pr(X=5)$

$= .23 + .07 = .30$

$Pr(Z=1) = Pr(X=-1) + Pr(X=1)$

$= .32 + .35 = .67$

$Pr(Z=100) = Pr(X=10) = .03$

2. (3 pts. each) Suppose that 75% of all minivans on the road today are blue.

(a) What is the probability that of the next 10 minivans you see on the road, exactly six are blue?

$$Pr(6 \text{ blue}) = \binom{10}{6}(.75)^6(.25)^4 \approx .146$$

(b) What is the probability that of the next 10 minivans you see on the road, at least one is blue? (Hint: It is easier to find the probability of the *complement* of this event.)

$$Pr(\text{at least one blue}) = 1 - Pr(\text{none are blue})$$

$$= 1 - \binom{10}{0}(.75)^0(.25)^{10} \approx .999999$$