

**Quiz 4****October 16, 2002(Correction)**

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1. Fill the empty space and calculate the expected value and standard deviation of the random variable X having the following probability distribution:

$X$	5	4	9	2	5	4	10
$p(X)$	0.25	0.01	0.34	0.20	0.10	<u>0.04</u>	0.06

2. A person is flipping a coin 10 times. The person thinks that the probability of having a Head is  $p=0.45$ . If X describes the number of times the person gets heads, using the Binomial distribution, calculate the following probabilities and give the detail of your calculation:

$$\frac{n!}{x!(n-x)!} (p)^x (1-p)^{n-x}$$

a.  $P(x=0) = \frac{10!}{0!(10-0)!} (0.45)^0 (1-0.45)^{10-0} = 0.0025330$

b.  $P(x=9) = \frac{10!}{9!(10-9)!} (0.45)^9 (1-0.45)^{10-9} = 0.0041617$

c.  $P(x=5) = \frac{10!}{5!(10-5)!} (0.45)^5 (1-0.45)^{10-5} = 0.23403$

d.  $P(x=8) = \frac{10!}{8!(10-8)!} (0.45)^8 (1-0.45)^{10-8} = 0.022890$

e.  $P(x=3) = \frac{10!}{3!(10-3)!} (0.45)^3 (1-0.45)^{10-3} = 0.16648$

f.  $P(x=7) = \frac{10!}{7!(10-7)!} (0.45)^7 (1-0.45)^{10-7} = 0.074603$

g. Fill then the following table that summarizes those probabilities and plot the probability distribution of the number of heads

$x = 0$	$x = 1$	$x = 2$	$x = 3$	$x = 4$	$x = 5$	$x = 6$	$x = 7$	$x = 8$	$x = 9$	$x = 10$
0.0025	0.0207	0.076	0.1664	0.238	0.2340	0.159	0.074	0.0229	0.00416	0.00034