No:

Date: ....

3. a) $S = X_1 + X_2$

$Var(S) = var(X_1) + Var(X_2)$

$= \Sigma (X_i - M)^2 . P_1 + \Sigma (X_2 - M_2)^2 . P_2$

$= 2 [(1-3.5)^2 . \frac{1}{6} + (2-3.5)^2 . \frac{1}{6} + (3-3.5)^2 \frac{1}{6} + (4-3.5)^2 . \frac{1}{6}) + (5-3.5)^2 . \frac{1}{6} + (6-3.5)^2 . \frac{1}{6}]$

because $X_1 = X_2$ and both are independent

$= 2 (1.04 + 0.375 + 0.04 + 1.04 + 0.04 + 0.375)$

$V(S) = 5.82$

$M_1 = E(X_1) = \Sigma P_i . X_1$

$= (1 . \frac{1}{6}) + (2 . \frac{1}{6}) + 3(\frac{1}{6}) + 4(\frac{1}{6}) + 5(\frac{1}{6}) + 6(\frac{1}{6})$

$= \frac{1}{6} + \frac{2}{6} + \frac{3}{6} + \frac{4}{6} + \frac{5}{6} + \frac{6}{6}$

$= 3.5$

b) $S = X_1 + X_2$

The events we can obtain from this condition are :

$1 \leftarrow S = 2 \rightarrow \{ (1,1) \}$

$2 \leftarrow S = 3 \rightarrow \{ (1,2), (2,1) \}$

$3 \leftarrow S = 4 \rightarrow \{ (1,3), (2,2), (3,1) \}$

$4 \leftarrow S = 5 \rightarrow \{ (1,4), (2,3), (3,2), (4,1) \}$

$5 \leftarrow S = 6 \rightarrow \{ (1,5), (2,4), (3,3), (4,2), (5,1) \}$

$S = 7 \rightarrow \{ (1,6), (2,5), (3,4), (4,3), (5,2), (6,1) \} \rightarrow 6$

$S = 8 \rightarrow \{ (2,6), (3,5), (4,4), (5,3), (6,2) \} \rightarrow 5$

$S = 9 \rightarrow \{ (3,6), (4,5), (5,4), (6,3) \} \rightarrow 4$

$S = 10 \rightarrow \{ (4,6), (5,5), (6,4) \} \rightarrow 3$

$S = 11 \rightarrow \{ (5,6), (6,5) \} \rightarrow 2$

$S = 12 \rightarrow \{ (6,6) \} \rightarrow 1$

X	$p(x) = P(X = x)$
2	$\frac{1}{36}$
3	$\frac{2}{36}$
4	$\frac{3}{36}$
5	$\frac{4}{36}$
6	$\frac{5}{36}$
7	$\frac{6}{36}$
8	$\frac{5}{36}$
9	$\frac{4}{36}$
10	$\frac{3}{36}$
11	$\frac{2}{36}$
12	$\frac{1}{36}$

c) $P(x, X = x) = \dfrac{(\text{number of items in } X)}{(\text{number of items in } S)}$