

Show your effort. No credit will be given if no appropriate explanation follows.

1. (10 pts.) Let Y be a random variable distributed as shown in the accompanying table.

y	1	2	3	4
$f(y)$.1	.2	.3	.4

Find $E(y)$ and $\text{var}(y)$.

2. (70 pts.) The joint probability distribution of X and Y is given by the following table: (For example, $f(4,9) = 0$.)

$x \backslash y$	1	3	9
2	1/8	1/24	1/12
4	1/4	1/4	0
6	1/8	1/24	1/12

- (1) Derive the marginal pdfs of X and Y .
 - (2) Determine whether X and Y are stochastically independent or not.
 - (3) Compute population means of X and Y .
 - (4) Compute population variances of X and Y .
 - (5) Compute the correlation coefficient between X and Y .
 - (6) Check whether or not $\Pr(X = 2|Y = 9) = \Pr(Y = 9|X = 2)$.
 - (7) Given $X = 2$, find the population mean of Y , i.e., $E(Y|X = 2)$
[Hint: $E(Y|X = 2) = \sum_y yf(y|x=2)$].
3. (20 pts.) Let $X \sim N(2,9)$, $Z \sim N(0,1)$, $Y \sim \chi^2(4)$ and $W \sim \chi^2(5)$. Assume that all of the random variables X , Z , Y and W are stochastically independent.
- (1) Find $\Pr(X < 6)$.
 - (2) Find $\Pr(Y < 9.49)$.
 - (3) Find $\Pr\left(Z > 3.75\sqrt{Y/4}\right)$.
 - (4) Find $\Pr\left(\frac{5Y}{4W} > 5.19\right)$.