

Name: _____

On this quiz, you **do not** need to calculate the final answer. An answer that looks something like

$$\frac{\binom{6}{2}\binom{8}{5}}{\binom{23}{4}} \quad \text{or} \quad \frac{(12)_3 + (11)(10)(9)}{14!}$$

is entirely acceptable. **You should compute any integrals, though.**

1. Let X and Y be discrete random variables with joint probability mass function given by the following table:

		Y		
		1	2	3
X	1	.1	.2	0
	2	.3	.1	.1
	3	0	.1	.1

- (a) Give the marginal probability mass functions of X and Y . (That is, find $P(X = k)$ and $P(Y = k)$ for $k = 1, 2, 3$.)

Solution:

$$\begin{aligned} p_X(1) &= .3, & p_X(2) &= .5, & p_X(3) &= .2 \\ p_Y(1) &= .4, & p_Y(2) &= .4, & p_Y(3) &= .2. \end{aligned}$$

- (b) Find $P(X = Y)$.

Solution:

$$\begin{aligned} P(X = Y) &= P(X = Y = 1) + P(X = Y = 2) + P(X = Y = 3) \\ &= .1 + .1 + .1 = .3. \end{aligned}$$

- (c) Find $E[(X - 1)e^Y]$.

Solution:

$$\begin{aligned} E[Xe^Y] &= .1(0)e^1 + .2(0)e^2 + .3(1)e^1 + .1(1)e^2 + .1(1)e^3 + .1(2)e^2 + .1(2)e^3 \\ &= .3e + .3e^2 + .3e^3. \end{aligned}$$