

Name Jerry

Student Number _____

STA 302 f2016 Quiz 1

$$E(x) = \sum_x x p_x(x)$$

$$E(x) = \int_{-\infty}^{\infty} x f_x(x) dx$$

$$E(g(x)) = \sum_x g(x) p_x(x)$$

$$E(g(\mathbf{x})) = \sum_{x_1} \cdots \sum_{x_p} g(x_1, \dots, x_p) p_{\mathbf{x}}(x_1, \dots, x_p)$$

$$E(g(x)) = \int_{-\infty}^{\infty} g(x) f_x(x) dx$$

$$E(g(\mathbf{x})) = \int_{-\infty}^{\infty} \cdots \int_{-\infty}^{\infty} g(x_1, \dots, x_p) f_{\mathbf{x}}(x_1, \dots, x_p) dx_1 \cdots dx_p$$

$$E(\sum_{i=1}^n a_i x_i) = \sum_{i=1}^n a_i E(x_i)$$

$$\text{Var}(x) = E((x - \mu_x)^2)$$

$$\text{Cov}(x, y) = E((x - \mu_x)(y - \mu_y)) \quad \text{Corr}(x, y) = \frac{\text{Cov}(x, y)}{\sqrt{\text{Var}(x)\text{Var}(y)}}$$

1. (5 points) Let $\mathbf{A} = \begin{pmatrix} 2 & 5 \\ 1 & -4 \end{pmatrix}$ and $\mathbf{B} = \begin{pmatrix} 1 & 0 \\ 2 & 3 \end{pmatrix}$.

Calculate $\mathbf{AB}$. Show your work.

$$\mathbf{AB} = \begin{array}{|c|c|} \hline 2+10 & 0+15 \\ \hline 1-8 & 0-12 \\ \hline \end{array} = \begin{pmatrix} 12 & 15 \\ -7 & -12 \end{pmatrix}$$

2. (5 points) The discrete random variables x and y have joint distribution

	$x = -1$	$x = 0$	$x = 1$
$y = 0$	$1/10$	$2/10$	$3/10$
$y = 1$	$1/10$	0	$3/10$
	$2/10$	$2/10$	$6/10$

Find $E(5x + 1)$. You may use any facts you know about expected values. Show your work. **Circle your final answer.**

$$E(x) = \sum_x x p(x) = (-1) \frac{2}{10} + (0) \frac{2}{10} + (1) \frac{6}{10} = \frac{4}{10}$$

$$E(5x + 1) = 5E(x) + 1 = 5 \cdot \frac{4}{10} + 1 = 2 + 1 = \boxed{3}$$