Name: _____ TA Name: _____ Secret Word: _____

Data 88S

March 15, 2024

1. Given that $E(X) = 10$, and $Var(X) = 5$, calculate the following values.

   (a) $E(4), SD(4)$ (Hint: what is the expectation and variance of a constant?)

   (b) $E(3X), SD(3X)$

   (c) $E(3X + 4), SD(3X + 4)$

Chapter 6, Exercise 2

2. A person is picked at random from a population. Let Y be the year in which the person was born, and suppose $E(Y) = 1997$ and $SD(Y) = 2$. Define the person's age in 2019 to be $X = 2019 - Y$. Find $E(X)$ and $SD(X)$.

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3. **Chapter 6, Exercise 4**

4. Let X have distribution

x	1	2	3	4
$P(X = x)$	0.4	0.1	0.1	0.4

Let Y have distribution

y	1	2	3	4
$P(Y = Y)$	0.1	0.4	0.4	0.1

In each part, say which of the two quantities is bigger (if any) and explain why.

a) $E(X)$, $E(Y)$

b) $SD(X)$, $SD(Y)$

Chapter 6, Exercise 5

4. Let $p \in (0, 1)$ and let X be the number of spots showing on a flattened die that shows its six faces according to the following chances:

   - $P(X = 1) = P(X = 6)$
   - $P(X = 2) = P(X = 3) = P(X = 4) = P(X = 5)$
   - $P(X = 1 \text{ or } 6) = p$

   Find $SD(X)$ and explain why it is an increasing function of p.