

# Classroom Voting Questions: Elementary Statistics

## Means and Variances of Random Variables

1. Suppose that a random variable  $X$  has only two values, 0 and 1. If  $P(X = 0) = 0.5$  then what can we say about  $E(X)$ ?
  - (a)  $E(X) = 0$
  - (b)  $E(X) = 0.5$
  - (c)  $E(X) = 1$
  - (d) Either (A) or (C) is possible.
  - (e) Both (A) and (C).
  - (f) insufficient information
  
2. Suppose that a random variable  $X$  has only two values, 0 and 1. If  $P(X = 0) = 0.5$  then what can we say about  $\text{Var}(X)$ ?
  - (a)  $\text{Var}(X) = -0.25$
  - (b)  $\text{Var}(X) = 0$
  - (c)  $\text{Var}(X) = 0.25$
  - (d)  $\text{Var}(X) = 0.5$
  - (e)  $\text{Var}(X) = 1$
  - (f) insufficient information
  
3. Suppose that a random variable  $X$  has only two values, 3 and 4. If  $P(X = 3) = 0.5$  then what can we say about  $E(X)$ ?
  - (a)  $E(X) = 0.5$
  - (b)  $E(X) = 1$
  - (c)  $E(X) = 3$
  - (d)  $E(X) = 3.5$
  - (e)  $E(X) = 4$
  
4. Suppose that a random variable  $X$  has only two values, 3 and 4. If  $P(X = 3) = 0.5$  then what can we say about  $\text{Var}(X)$ ?

- (a)  $\text{Var}(X) = 0.25$
- (b)  $\text{Var}(X) = 0.5$
- (c)  $\text{Var}(X) = 0.75$
- (d)  $\text{Var}(X) = 1.0$
- (e)  $\text{Var}(X) = 3.25$
- (f)  $\text{Var}(X) = 3.5$

5. Suppose your instructor asks you a multiple-choice question with three answer choices in class. You are to submit your answer and also rate the confidence (low, medium, or high) with which you believe in that answer. You will be scored based on the following chart.

Confidence	Correct Answer	Incorrect Answer
Low	3	2
Medium	4	1
High	5	0

If have no idea what the answer to the question is and you have to guess randomly among the three available answer choices, what confidence level should you choose in order to maximize your points?

- (a) Low
- (b) Medium
- (c) High
- (d) It doesn't matter.

6. Suppose your instructor asks you a multiple-choice question with *two* answer choices in class. You are to submit your answer and also rate the confidence (low, medium, or high) with which you believe in that answer. You will be scored based on the following chart.

Confidence	Correct Answer	Incorrect Answer
Low	3	2
Medium	4	1
High	5	0

If have no idea what the answer to the question is and you have to guess randomly among the two available answer choices, what confidence level should you choose in order to maximize your points?

- (a) Low
- (b) Medium

- (c) High
  - (d) It doesn't matter.
7. A small store located not too far from a campground sells cartons containing six eggs. Each customer is limited to a maximum purchase of three cartons. Among customers who buy eggs, 50% buy one carton, 30% buy two cartons, and 20% buy three cartons. What is the mean number of eggs purchased by customers who purchase eggs?
- (a) 1.7
  - (b) 3.4
  - (c) 10.2
  - (d) 12
8. Manuel, a biology major, works in the Admissions Office to help cover his tuition and other expenses. One day a mysterious stranger drops by the Admissions Office and offers Manuel the opportunity to play the following game one time: A fair coin will be flipped. If the coin comes up heads, Manuel will be given \$3. If the coin comes up tails, Manuel has to pay \$1. Should Manuel play the game?
- (a) Yes, because the expected value for Manuel is positive.
  - (b) This is a fair game, so one can't really answer "Yes" or "No."
  - (c) No, because the expected value for Manuel is negative.
9. Manuel, a biology major, works in the Admissions Office to help cover his tuition and other expenses. One day a mysterious stranger drops by the Admissions Office and offers Manuel the opportunity to play the following game one time: A fair coin will be flipped. If the coin comes up heads, Manuel will be given three million dollars. If the coin comes up tails, Manuel has to pay one million dollars. Should Manuel play the game?
- (a) Yes, because the expected value for Manuel is positive.
  - (b) No, because the expected value for Manuel is negative.
  - (c) Yes, because the standard deviation is large.
  - (d) No, because the standard deviation is large.