

# Classroom Voting Questions: Elementary Statistics

## Random Variables

1. Draw the following dart board: A dart board is constructed from three concentric circles with radii 1 inch, 2 inches, and 3 inches, respectively. If a dart lands in the innermost circle, the player receives 4 points. If the dart lands between the innermost circle and the middle circle, the player receives 2 points. If the dart lands between the middle circle and the outermost circle, the player receives 1 point. Assume that the probability of a dart landing in any particular region is proportional to the area of that region.

Define the random variable  $X$  to be the sum of the player's score on two successive throws. Then  $X$  is what type of random variable?

- (a) discrete
- (b) continuous

2. Draw the following dart board: A dart board is constructed from three concentric circles with radii 1 inch, 2 inches, and 3 inches, respectively. If a dart lands in the innermost circle, the player receives 4 points. If the dart lands between the innermost circle and the middle circle, the player receives 2 points. If the dart lands between the middle circle and the outermost circle, the player receives 1 point. Assume that the probability of a dart landing in any particular region is proportional to the area of that region.

Suppose that a player's score on a single dart throw is defined to be the distance between the dart and the center of the board. Define the random variable  $X$  to be the sum of the player's score on two successive throws. Then  $X$  is what type of random variable?

- (a) discrete
- (b) continuous

3. A radioactive mass emits particles at an average rate of 15 particles per minute. Define the random variable  $X$  to be the number of particles emitted in a 10-minute time frame. Then  $X$  is what type of random variable?

- (a) discrete
- (b) continuous

4. A radioactive mass emits particles at an average rate of 15 particles per minute. A particle is emitted at noon today. Define the random variable  $X$  to be the time elapsed between noon and the next emission. Then  $X$  is what type of random variable?
- (a) discrete
  - (b) continuous
5. A randomly-selected kindergarten class in a large city will get to have a party on Friday of next week. At one point in the party, each child in the class will receive half of a candy bar. Define the random variable  $X$  to be the number of candy bars given out in the class next Friday. Then  $X$  is what type of random variable?
- (a) discrete
  - (b) continuous
6. Consider the continuous random variable  $X =$  the weight in pounds of a randomly selected newborn baby born in the United States during 2006. Let  $f$  be the probability density function for  $X$ . It is probably safe to say that  $P(X < 0) = 0$  and  $P(X < 20) = 1$ . Which of the following is *not* a justifiable conclusion about  $f$  given this information?
- (a) No portion of the graph of  $f$  can lie below the  $x$ -axis.
  - (b) The area under the entire graph of  $f$  equals 1.
  - (c) The area under the graph of  $f$  between  $x = 0$  and  $x = 20$  is 1.
  - (d) The nonzero portion of the graph of  $f$  lies entirely between  $x = 0$  and  $x = 19$ .
7. Two standard, six-sided dice are rolled. What is the probability that the sum of the dice is 6?
- (a)  $\frac{1}{6}$
  - (b)  $\frac{5}{6}$
  - (c)  $\frac{1}{12}$
  - (d)  $\frac{5}{12}$
  - (e)  $\frac{1}{36}$
  - (f)  $\frac{5}{36}$
8. Two standard, six-sided dice are rolled. What is the most probable sum?
- (a) 2
  - (b) 6

- (c) 7
- (d) 12

9. Consider rolling a standard, six-sided die. Let  $A$  be the event that the number rolled is even. Let  $B$  be the event that the number rolled is a multiple of 3. The event  $(\text{not}B)$  consists of

- (a) 1, 3, 5
- (b) 1, 2, 4, 5
- (c) 2, 4, 6
- (d) 1, 3, 5

10. Consider rolling a standard, six-sided die. Let  $A$  be the event that the number rolled is even. Let  $B$  be the event that the number rolled is a multiple of 3. The event  $(A \text{ and } B)$  consists of

- (a) 2, 3, 4, 6
- (b) 2, 3, 4, 6, 6
- (c) 6

11. Consider rolling a standard, six-sided die. Let  $A$  be the event that the number rolled is even. Let  $B$  be the event that the number rolled is a multiple of 3. The event  $(A \text{ or } B)$  consists of

- (a) 2, 3, 4, 6
- (b) 2, 3, 4, 6, 6
- (c) 6

12. A standard, six-sided die is rolled. What is the probability of rolling an even number or a number divisible by 3?

- (a)  $\frac{2}{3}$
- (b)  $\frac{5}{6}$
- (c) 4
- (d) 5

13. A card is drawn at random from a standard deck of 52 playing cards. What is the probability that the card is a red card or a jack?

(a) 28

(b) 30

(c)  $\frac{7}{13}$

(d)  $\frac{15}{26}$