

Each problem is worth 10 points.

1. The payoff (X) for a lottery game has the following probability distribution.

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|-------------|-----|-----|
| X = payoff | \$0 | \$5 |
| probability | 0.8 | 0.2 |

What is the *expected value* of X= payoff?

- A. \$0
 - B. \$0.50
 - C. \$1.00
 - D. \$2.50
2. The expected value of a random variable is the
- A. value that has the highest probability of occurring.
 - B. mean value over an infinite number of observations of the variable.
 - C. largest value that will ever occur.
 - D. most common value over an infinite number of observations of the variable.
3. Which one of these variables is a continuous random variable?
- A. The time it takes a randomly selected student to complete an exam.
 - B. The number of tattoos a randomly selected person has.
 - C. The number of women taller than 68 inches in a random sample of 5 women.
 - D. The number of correct guesses on a multiple choice test.
4. Heights of college women have a distribution that can be approximated by a normal curve with a mean of 65 inches and a standard deviation equal to 3 inches. About what proportion of college women are between 65 and 67 inches tall?
- A. 0.75
 - B. 0.50
 - C. 0.25
 - D. 0.17
5. Which one of these variables is a binomial random variable?
- A. time it takes a randomly selected student to complete a multiple choice exam
 - B. number of textbooks a randomly selected student bought this term
 - C. number of women taller than 68 inches in a random sample of 5 women
 - D. number of CDs a randomly selected person owns

6. Suppose that vehicle speeds at an interstate location have a normal distribution with a mean equal to 70 mph and standard deviation equal to 8 mph. What is the z-score for a speed of 64 mph?
- A. -0.75
 - B. $+0.75$
 - C. -6
 - D. $+6$
7. Pulse rates of adult men are approximately normal with a mean of 70 and a standard deviation of 8. Which choice correctly describes how to find the proportion of men that have a pulse rate greater than 78?
- A. Find the area to the left of $z = 1$ under a standard normal curve.
 - B. Find the area between $z = -1$ and $z = 1$ under a standard normal curve.
 - C. Find the area to the right of $z = 1$ under a standard normal curve.
 - D. Find the area to the left of $z = -1$ under a standard normal curve.
8. The probability is $p = 0.80$ that a patient with a certain disease will be successfully treated with a new medical treatment. Suppose that the treatment is used on 40 patients. What is the "expected value" of the number of patients who are successfully treated?
- A. 40
 - B. 20
 - C. 8
 - D. 32
9. Suppose that a quiz consists of 20 True-False questions. A student hasn't studied for the exam and will just randomly guesses at all answers (with True and False equally likely). How would you find the probability that the will student get 8 or fewer answers correct?
- A. Find the probability that $X=8$ in a binomial distribution with $n = 20$ and $p=0.5$.
 - B. Find the area between 0 and 8 in a uniform distribution that goes from 0 to 20.
 - C. Find the probability that $X=8$ for a normal distribution with mean of 10 and standard deviation of $\sqrt{5}$.
 - D. Find the cumulative probability for 8 in a binomial distribution with $n = 20$ and $p = 0.5$.
10. The normal approximation to the binomial distribution is most useful for finding which of the following?
- A. The probability $P(X = k)$ when X is a binomial random variable with large n .
 - B. The probability $P(X \leq k)$ when X is a binomial random variable with large n .
 - C. The probability $P(X = k)$ when X is a normal random variable with small n .
 - D. The probability $P(X \leq k)$ when X is a normal random variable with small n .