

The 4077th Mobile Army Surgical Hospital is considering the purchase of a helicopter to transport critical patients. The **probability distribution** of X , the number of patient helicopter transports per month, is determined from a similarly-sized army hospital as given by the probability distribution below.

Number of Helicopter Transports per Month

X	0	1	2	3	4	5	6
$P(X)$	0.15	0.20	0.34	0.19	0.06	0.05	0.01

For all of the following problems, include **probability notation**, label values with the appropriate **symbol**, show your **work**, and include **units** wherever applicable.

1. **Verify** that this is a valid discrete probability distribution.
2. Find the probability that a helicopter will **not be used** at all to transport patients in a month.
3. Find the probability that a helicopter will be used **at least once** to transport critical patients.
4. Find the **expected number** of times a helicopter will be used to transport critical patients each month. Show your work using the appropriate formula. (You should only use your calculator to check your work.)
5. **Interpret** the expected value in context of the problem.
6. Find the **standard deviation** of the number of times a helicopter will be used to transport critical patients in a month. Show your work using the appropriate formula. (Use your calculator to check your work.)

7. Build-a-Bear distributors claim that there is only a 2% chance that an unstuffed bear has a sewing defect. Your store received a shipment of 200 unstuffed bears. Let X = the number of bears with defects. Round all probabilities in the following problems to **four** decimal places.
- (a) What is the probability that **exactly** 10 bears have a defect? Show probability notation, the **binomial formula** with values plugged in, and your answer.
- (b) What is the probability that **at most** 10 bears have a defect? Show probability notation and your answer.
- (c) What is the probability that **at least two** bears have defects? Show probability notation and your answer.
- (d) What is the **expected number** of defective bears in your shipment? Include units, the appropriate symbol, and your calculations.
- (e) What is the **standard deviation** of defective bears in your shipment? Include units, the appropriate symbol, and your calculations.

8. A student is taking a True/False test consisting of 6 questions. If the student randomly selects each answer, what is the probability that they get at least two answers correct? You may assume that each answer is independent of another.

A. 0.3438
 B. 0.8906
 C. 0.6563
 D. 0.1094

9. According to the U.S. Census Bureau, 13.1% of U.S. adults have an advanced degree. A random sample of 5 U.S. adults is taken. Let X be the number of U.S. adults in a sample of size 5 who have an advanced degree. If X is a binomial random variable, what is the probability that at least one of these 5 people has an advanced degree?

A. 0.8690
 B. 0.5044
 C. 0.4956
 D. 0.6550

10. W is a discrete random variable with the distribution given below.

W	1	2	4
$P(W)$	0.2	0.5	0.3

- (a) What is the expected value of W ?

A. 2.4
 B. 1.11
 C. 1.24
 D. 2

- (b) What is the standard deviation of W ?

A. 2.4
 B. 1.11
 C. 1.24
 D. 2

11. Suppose the Clemson women's softball team needs to win 4 out of 7 games in a championship game series. Once a team reaches the 4th win, it is declared the winner of the series and the series ends. Let X be the number of games played in the series. Could X be considered a Binomial random variable?

A. Yes, since the only options for the outcomes of the game are Win, Lose, or Tie.
 B. No, since the number of games played is not fixed.
 C. Yes, since the probability of winning a game is unknown.
 D. No, since X can only take values between 0 and 7.

12. TD's has a sampler appetizer platter that lets you choose four appetizers for \$6.99. They have 11 appetizers to choose from. How many appetizer combinations could you choose?