

Name:

Partners:

Statistics

Date:

Review 5 Version A

**[A] Circle whether each statement is true or false.**

- T F 1. "Less than 5 successes" means  $r = 1, 2, 3, \text{ or } 4$ .
- T F 2. Number of successes is a continuous variable.
- T F 3. The standard deviation of a binomial distribution is  $\sqrt{npq}$ .
- T F 4. The sum of probabilities in any probability distribution is 1.
- T F 5. The complement of at least 8 successes is at most 7 successes.
- T F 6. "The first success is on the fifth trial" means the first four trials were all failures.
- T F 7. A probability distribution states all possible outcomes and how likely each one is.

**[B] Gavin is rolling four 6-sided dice. For each of the following expressions, calculate the value without using decimals or percents, and use a complete sentence to explain what it represents in this context. Start each answer with *This is the probability that...* or with *This is the number of ways that...***

1.  $\binom{4}{3}$

2.  $\left(\frac{1}{6}\right)^3 \left(\frac{5}{6}\right)^1$

3.  $\binom{4}{3} \left(\frac{1}{6}\right)^3 \left(\frac{5}{6}\right)^1$

4.  $\binom{4}{3} \left(\frac{1}{6}\right)^3 \left(\frac{5}{6}\right)^1 + \binom{4}{4} \left(\frac{1}{6}\right)^4 \left(\frac{5}{6}\right)^0$

**[C] Tanner makes a spinner such that players have a 15% chance of winning \$40 and a 5% chance of winning \$200.**

1. Is this probability distribution discrete or continuous? Justify your answer.

2. Calculate the mean and standard deviation of the distribution.

**[D] To test Sarah's mindreading ability, Cassidy has her guess 5 rolls on a 4-sided die. Sarah successfully guesses 4 of the rolls.**

1. Give the following values.

- a)  $n$                       b)  $r$                       c)  $p$                       d)  $q$                       e)  $\mu$                       f)  $\sigma$

2. Make a histogram showing the probability distribution for number of successful guesses out of 5 rolls. Round each probability to the nearest whole percent.

3. Explain why this and all other binomial probability distributions are discrete.

4. Calculate the probability of each of the following using a calculator. Write exactly what is typed.

a) exactly 4 correct predictions

b) at most 4 correct predictions

c) at least 4 correct predictions

5. Redo problem 4c by hand, using only fractions.

6. Sarah then does several more guesses. Calculate the following probabilities for these rolls using fractions only.

a) Her first correct guess is her 3<sup>rd</sup> try.

b) Her first correct guess is after her 3<sup>rd</sup> try.

**[E] Do the following to organize your group's reviews.**

1. Make sure your name and your partners' names are at the top of your review the first day.

2. Staple the reviews in order, all facing the same way. Put the staple in the very top left corner if everyone is finished or if the review is due; otherwise put the staple in the top right corner.

Name:

Statistics

Date:

Review 5 Version B

**[A] Circle whether each statement is true or false.**

- T F 1. "Less than 5 successes" means  $r = 1, 2, 3, \text{ or } 4$ .
- T F 2. Number of successes is a continuous variable.
- T F 3. The standard deviation of a binomial distribution is  $\sqrt{npq}$ .
- T F 4. The sum of probabilities in any probability distribution is 1.
- T F 5. The complement of at least 8 successes is at most 7 successes.
- T F 6. "The first success is on the fifth trial" means the first four trials were all failures.
- T F 7. A probability distribution states all possible outcomes and how likely each one is.

**[B] Gavin is rolling four 6-sided dice. For each of the following expressions, calculate the value without using decimals or percents, and use a complete sentence to explain what it represents in this context. Start each answer with *This is the probability that...* or with *This is the number of ways that...***

1.  $\binom{4}{1}$

2.  $\binom{1}{6}^1 \left(\frac{5}{6}\right)^3$

3.  $\binom{4}{1} \left(\frac{1}{6}\right)^1 \left(\frac{5}{6}\right)^3$

4.  $\binom{4}{1} \left(\frac{1}{6}\right)^1 \left(\frac{5}{6}\right)^3 + \binom{4}{0} \left(\frac{1}{6}\right)^0 \left(\frac{5}{6}\right)^4$

**[C] Tanner makes a spinner such that players have a 20% chance of winning \$120 and a 3% chance of winning \$500.**

1. Is this probability distribution discrete or continuous? Justify your answer.

2. Calculate the mean and standard deviation of the distribution.

**[D] To test Sarah's mindreading ability, Cassidy has her guess 5 rolls on a 6-sided die. Sarah successfully guesses 3 of the rolls.**

1. Give the following values.

- a)  $n$                       b)  $r$                       c)  $p$                       d)  $q$                       e)  $\mu$                       f)  $\sigma$

2. Make a histogram showing the probability distribution for number of successful guesses out of 5 rolls. Round each probability to the nearest tenth of a percent.

3. Explain why this and all other binomial probability distributions are discrete.

4. Calculate the probability of each of the following using a calculator. Write exactly what is typed.

a) exactly 3 correct predictions

b) at most 3 correct predictions

c) at least 3 correct predictions

5. Redo problem 4c by hand, using only fractions.

6. Sarah then does several more guesses. Calculate the following probabilities for these rolls using fractions only.

a) Her first correct guess is her 3<sup>rd</sup> try.

b) Her first correct guess is after her 3<sup>rd</sup> try.

**[E] Bonus.**

1. The standard criterion for statistical significance is 5%: If a predicted outcome occurs despite having a probability below 5%, it is proposed that the outcome did not happen coincidentally. Based on this, if Cassidy has Sarah predict 20 rolls, how many of these does Sarah need to predict correctly for Cassidy to believe that it was not a coincidence?

Name:

Statistics

Date:

Review 5 Version C

**[A] Circle whether each statement is true or false.**

- T F 1. "Less than 5 successes" means  $r = 1, 2, 3, \text{ or } 4$ .
- T F 2. Number of successes is a continuous variable.
- T F 3. The standard deviation of a binomial distribution is  $\sqrt{npq}$ .
- T F 4. The sum of probabilities in any probability distribution is 1.
- T F 5. The complement of at least 8 successes is at most 7 successes.
- T F 6. "The first success is on the fifth trial" means the first four trials were all failures.
- T F 7. A probability distribution states all possible outcomes and how likely each one is.

**[B] Gavin is rolling five 6-sided dice. For each of the following expressions, calculate the value without using decimals or percents, and use a complete sentence to explain what it represents in this context. Start each answer with *This is the probability that...* or with *This is the number of ways that...***

1.  $\binom{5}{1}$

2.  $\binom{1}{6}^1 \left(\frac{5}{6}\right)^4$

3.  $\binom{5}{1} \left(\frac{1}{6}\right)^1 \left(\frac{5}{6}\right)^4$

4.  $\binom{5}{1} \left(\frac{1}{6}\right)^1 \left(\frac{5}{6}\right)^4 + \binom{5}{0} \left(\frac{1}{6}\right)^0 \left(\frac{5}{6}\right)^5$

**[C] Tanner makes a spinner with 25 spots of equal size. Five of them yield a prize of \$50, and one of them yields a prize of \$400.**

1. Is this probability distribution discrete or continuous? Justify your answer.

2. Calculate the mean and standard deviation of the distribution.

**[D] To test Sarah's mindreading ability, Cassidy has her guess 5 rolls on an 8-sided die. Sarah successfully guesses 2 of the rolls.**

1. Give the following values.

- a)  $n$                       b)  $r$                       c)  $p$                       d)  $q$                       e)  $\mu$                       f)  $\sigma$

2. Make a histogram showing the probability distribution for number of successful guesses out of 5 rolls. Round each probability to three decimal places.

3. Explain why this and all other binomial probability distributions are discrete.

4. Calculate the probability of each of the following using a calculator. Write exactly what is typed.

a) exactly 2 correct predictions

b) at most 2 correct predictions

c) at least 2 correct predictions

5. Redo problem 4c by hand, using only fractions.

6. Sarah then does several more guesses. Calculate the following probabilities for these rolls using fractions only.

a) Her first correct guess is her 3<sup>rd</sup> try.

b) Her first correct guess is after her 3<sup>rd</sup> try.

**[E] Bonus.**

1. The standard criterion for statistical significance is 5%: If a predicted outcome occurs despite having a probability below 5%, it is proposed that the outcome did not happen coincidentally. Based on this, if Cassidy has Sarah predict 40 rolls, how many of these does Sarah need to predict correctly for Cassidy to believe that it was not a coincidence?

Name:

Statistics

Date:

Review 5 Version D

[A] Circle whether each statement is true or false.

- T F 1. "Less than 5 successes" means  $r = 1, 2, 3,$  or  $4$ .
- T F 2. Number of successes is a continuous variable.
- T F 3. The standard deviation of a binomial distribution is  $\sqrt{npq}$ .
- T F 4. The sum of probabilities in any probability distribution is 1.
- T F 5. The complement of at least 8 successes is at most 7 successes.
- T F 6. "The first success is on the fifth trial" means the first four trials were all failures.
- T F 7. A probability distribution states all possible outcomes and how likely each one is.

[B] Gavin is rolling four 6-sided dice. For each of the following expressions, calculate the value without using decimals or percents, and use a complete sentence to explain what it represents in this context. Start each answer with *This is the probability that...* or with *This is the number of ways that...*

1.  $\binom{4}{2}$

2.  $\left(\frac{1}{6}\right)^2\left(\frac{5}{6}\right)^2$

3.  $\binom{4}{2}\left(\frac{1}{6}\right)^2\left(\frac{5}{6}\right)^2$

4.  $\binom{4}{2}\left(\frac{1}{6}\right)^2\left(\frac{5}{6}\right)^2 + \binom{4}{1}\left(\frac{1}{6}\right)^1\left(\frac{5}{6}\right)^3 + \binom{4}{0}\left(\frac{1}{6}\right)^0\left(\frac{5}{6}\right)^4$

[C] Tanner makes a spinner with 30 spots of equal size. Five of them yield a prize of \$50, and one of them yields a prize of \$400.

1. Is this probability distribution discrete or continuous? Justify your answer.

2. Calculate the mean and standard deviation of the distribution.

**[D] To test Sarah's mindreading ability, Cassidy has her guess 6 rolls on a 8-sided die. Sarah successfully guesses 2 of the rolls.**

1. Give the following values.

- a)  $n$                       b)  $r$                       c)  $p$                       d)  $q$                       e)  $\mu$                       f)  $\sigma$

2. Make a histogram showing the probability distribution for number of successful guesses out of 6 rolls. Round each probability to the nearest hundredth of a percent.

3. Explain why this and all other binomial probability distributions are discrete.

4. Calculate the probability of each of the following using a calculator. Write exactly what is typed.

a) exactly 2 correct predictions

b) at most 2 correct predictions

c) at least 2 correct predictions

5. Redo problem 4c by hand, using only fractions.

6. Sarah then does several more guesses. Calculate the following probabilities for these rolls using fractions only.

a) Her first correct guess is her 3<sup>rd</sup> try.

b) Her first correct guess is after her 3<sup>rd</sup> try.

**[E] Bonus.**

1. The standard criterion for statistical significance is 5%: If a predicted outcome occurs despite having a probability below 5%, it is proposed that the outcome did not happen coincidentally. Based on this, if Cassidy has Sarah predict 100 rolls, how many of these does Sarah need to predict correctly for Cassidy to believe that it was not a coincidence?