Name _____ Score _____ Teacher _____ Date _____

Geometric Distribution

Let X count trials through the first success, so X has support 1, 2, ... Assume independent trials with constant success probability and round only final probabilities.

1. Let X count trials through the first success, with p = 9/20. Find the mean and population variance of X.

Assumptions: Trials are independent with constant success probability; X includes the successful trial and has support 1, 2, ...

2. Let X count trials through the first success, with p = 1/4. Find P(X >= 5), meaning at least 5 trials are required.

Assumptions: Trials are independent with constant success probability; X includes the successful trial and has support 1, 2, ...

Name _____ Score _____ Teacher _____ Date _____

Geometric Distribution

Let X count trials through the first success, so X has support 1, 2, ... Assume independent trials with constant success probability and round only final probabilities.

3. **Let X count trials through the first success, with p = 11/20. Find P(X <= 7), the first success by trial 7.**

Assumptions: Trials are independent with constant success probability; X includes the successful trial and has support 1, 2, ...

4. **Let X count trials through the first success, with p = 3/10. Find P(X = 3).**

Assumptions: Trials are independent with constant success probability; X includes the successful trial and has support 1, 2, ...

Name _____ Score _____ Teacher _____ Date _____

Geometric Distribution

Let X count trials through the first success, so X has support 1, 2, ... Assume independent trials with constant success probability and round only final probabilities.

5. Let X count trials through the first success, with p = 1/20. Find P(X = 2).

Assumptions: Trials are independent with constant success probability; X includes the successful trial and has support 1, 2, ...

6. Let X count trials through the first success, with p = 17/20. Find the mean and population variance of X.

Assumptions: Trials are independent with constant success probability; X includes the successful trial and has support 1, 2, ...

Name _____ Score _____ Teacher _____ Date _____

Geometric Distribution

Let X count trials through the first success, so X has support 1, 2, ... Assume independent trials with constant success probability and round only final probabilities.

7. Let X count trials through the first success, with p = 3/4. Find P(X >= 9), meaning at least 9 trials are required.

Assumptions: Trials are independent with constant success probability; X includes the successful trial and has support 1, 2, ...

8. Let X count trials through the first success, with p = 2/5. Find P(X <= 6), the first success by trial 6.

Assumptions: Trials are independent with constant success probability; X includes the successful trial and has support 1, 2, ...

Name _____ Score _____ Teacher _____ Date _____

Geometric Distribution

Worked Answer Key

Let X count trials through the first success, so X has support 1, 2, ... Assume independent trials with constant success probability and round only final probabilities.

1. **Let X count trials through the first success, with p = 9/20. Find the mean and population variance of X.**

Answer: mean 20/9, variance 220/81

1. E(X) = 1/p = 20/9 trials.
2. Var(X) = (1-p)/p^2 = 220/81 trials squared.

2. **Let X count trials through the first success, with p = 1/4. Find P(X >= 5), meaning at least 5 trials are required.**

Answer: approximately 0.316

1. Reaching trial 5 requires failures on the first 4 trials.
2. P(X>=5) = (1-1/4)^4 is approximately 0.316.

Name _____ Score _____ Teacher _____ Date _____

Geometric Distribution

Worked Answer Key

Let X count trials through the first success, so X has support 1, 2, ... Assume independent trials with constant success probability and round only final probabilities.

3. **Let X count trials through the first success, with p = 11/20. Find P(X <= 7), the first success by trial 7.**

Answer: approximately 0.996

1. Use the complement of 7 consecutive failures.
2. P(X<=7) = 1-(1-11/20)^7 is approximately 0.996.

4. **Let X count trials through the first success, with p = 3/10. Find P(X = 3).**

Answer: approximately 0.147

1. There are 2 failures followed by one success.
2. P(X=3) = (1-3/10)^2(3/10) is approximately 0.147.

Name _____ Score _____ Teacher _____ Date _____

Geometric Distribution

Worked Answer Key

Let X count trials through the first success, so X has support 1, 2, ... Assume independent trials with constant success probability and round only final probabilities.

5. **Let X count trials through the first success, with p = 1/20. Find P(X = 2).**

Answer: approximately 0.048

1. There are 1 failures followed by one success.
2. P(X=2) = (1-1/20)^1(1/20) is approximately 0.048.

6. **Let X count trials through the first success, with p = 17/20. Find the mean and population variance of X.**

Answer: mean 20/17, variance 60/289

1. E(X) = 1/p = 20/17 trials.
2. Var(X) = (1-p)/p^2 = 60/289 trials squared.

Name _____ Score _____ Teacher _____ Date _____

Geometric Distribution

Worked Answer Key

Let X count trials through the first success, so X has support 1, 2, ... Assume independent trials with constant success probability and round only final probabilities.

7. **Let X count trials through the first success, with p = 3/4. Find P(X >= 9), meaning at least 9 trials are required.**

Answer: approximately 1.526e-5

1. Reaching trial 9 requires failures on the first 8 trials.
2. P(X>=9) = (1-3/4)^8 is approximately 1.526e-5.

8. **Let X count trials through the first success, with p = 2/5. Find P(X <= 6), the first success by trial 6.**

Answer: approximately 0.953

1. Use the complement of 6 consecutive failures.
2. P(X<=6) = 1-(1-2/5)^6 is approximately 0.953.