BINOMIAL REVIEW

1. A burglar alarm system has 6 fail-safe components that act independently. The probability of each failing is 0.05.
2. Check to see that this is a Bernoulli trial/ Binomial model

- succes = alarm failing failure = alarm working

- p = 0.05 and is constant

- Independent trials stated

- n = 6

B(6, 0.05)

1. Find the probability that exactly 3 will fail.

P(X = 3) = 0.002

1. Find the probability that fewer than 2 will fail.

P(X < 2) = P(X < 1) = 0.9672

1. Find the probability that none will fail.

P(X = 0) = 0.7351

1. A student takes a 10-question multiple choice quiz with four choices for each question, and guesses on each question.
2. Check to see that this is a Bernoulli trial/binomial model

- success = right failure = wrong

- p = 0.25 and constant (assuming guessing)

- Independence: assuming guessing, each question is independent from others

- n = 10

B(10, 0.25)

1. Find the probability of guessing at least 6 correct.

P(X > 6) = 1- P(X < 5) = 0.0197

1. Find the probability of guessing less than 4 correct.

P(X < 4) = P(X < 3) = 0.7759

1. Find the probability of guessing more than 7 correct.

P(X > 7) = 1 – P(X < 7) = 4.158 x 10-4 = 0.0004158

1. We take a sample of 9 American children. It is known that 60% of American children have had German measles by the time they were 12 years old. We know that this is a Bernoulli trial. Find the probability that…

B(9, 0.60)

1. At least 5 have had German measles.

P(X > 5) = 1 – P(X < 4) = 0.7334

1. Exactly 7 have had German measles.

P(X = 7) = 0.1612

1. More than 3 have had German measles.

P(X > 3) = 1 – P(X < 3) = 0.9006

1. Between 2 and 7 have had German measles.

P( 2 < X < 7) = P(3 < X < 6) = P(X < 6) – P(X < 2) = 0.7432

1. In a restaurant, a study found that 42% of all patrons smoked. The seating capacity of the restaurant is 80 people. Assume this is a Bernoulli trial.

B(80, 0.42)

Find the mean and standard deviation for the number of patrons smoking.

$μ\_{X}=\left(80\right)\left(0.42\right)=33.6 patrons$

$σ\_{X}=\sqrt{\left(80\right)\left(0.42\right)(0.58)}=4.4145 patrons$