Statistical Reasoning Name:

8.3 – Binomial Distributions

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| Circle the correct answer to each question.   1. A B C D E 2. A B C D E 3. A B C D E 4. A B C D E 5. A B C D E 6. A B C D E 7. A B C D E 8. A B C D E 9. A B C D E 10. A B C D E   # correct = \_\_\_\_\_\_\_\_\_\_/ 10 | This is called a **BINOMIAL DISTRIBUTION**.  4 Criteria to be a Binomial Distribution:   1. Fixed number of trials (n) 2. Only two outcomes – success or failure 3. Each trial is independent 4. Probability of success is constant  (does not change over time)   *FORMULA for BINOMIAL DISTRIBUTION*:    Where *n*C *k*  *(the number of ways to have k successes out of n trials)*  *n* = fixed number of trials  *k* = number of successes  *p* = probability of a success  *1-p* = probability of failure  Mean of a Binomial Distribution = *np* | |
| 1. What is the probability of getting each question correct? 2. What is the probability of getting each question incorrect? 3. What is the probability of getting all 10 questions correct? | | 1. What is the probability of getting all 10 questions incorrect? 2. What is the probability you get 3 out of 10 questions correct? 3. What is the probability you get at least 1 question correct? |

 , where *n*C *k*

Ex 1: Suppose that the probability that a lightbulb is defective is 0.1 so the probability of being good is 0.9.

1. What is the probability that four lightbulbs are all defective?
2. What is the probability that exactly two out of three lightbulbs are defective?
3. What is the probability that exactly three out of eight lightbulbs are defective?

Ex 2: Super Mario cards were in one-third of cereal boxes advertising the cards. If six boxes of cereal are purchased, what is the probability that exactly two of them contained Super Mario cards?

Ex 3: A manufacturer has the following quality control check at the end of a production line: If at least 8 of the 10 randomly picked items meet all specifications, the whole shipment is approved. If, in reality, 85% of a particular shipment meets specifications, what is the probability that the shipment will make it through the control check?

Ex 4: A grocery store manager notes that 35% of customer who buy a particular product make use of a store coupon to receive a discount. If seven people purchase the product, what is the probability that fewer than four will use a coupon?

Ex 5: If the probability that a male birth will occur is .51, what is the probability that a five-child family will have all boys?

Exactly four boys? Exactly three boys? Exactly two boys?

Exactly one boy? All girls?