ALGEBRA 2H

Section 12.1: Introduction to Probability

NOTES

I.   **Definitions**

1.   **Probability**: The likelihood or _____ that an event will happen.

2.   **Event:** An individual outcome or any specified combination of outcomes.

   Examples: rolling a 3 on a die, getting heads when flipping a coin, rolling a 3 or a 5 on a die

3.   **Trial:** A systematic opportunity for an event to occur.

   Examples: Flipping a coin or rolling a die.

4.   **Experiment:** One or more _____.

5.   **Sample Space:** The set of all possible _____ of an event.

   Examples: What is the sample space for each event?

   (a)   flipping a coin: (List all possible outcomes for flipping a coin.)

   _____

   (b)   rolling a die: (List all possible outcomes for rolling a die.)

   _____

6.   **Random:** An event is considered random if all the possible outcomes are _____

   _____ to occur. (All outcomes have an equal chance.)

II.   **Probability**

1.   A probability is a numerical value between _____ and _____ that represents the likelihood (or chance) that an event will occur.

2.   A probability can be expressed as a _____, _____, or _____.

3.   If an event is impossible, then the probability is _____.

   Example: What is the probability of rolling a 7 on a standard die? _____

4.   If an event must occur, then the probability is _____.

   Example: What is the probability of rolling a number less than 7 on a standard die? _____

5.   There are 2 types of probability, the first is Theoretical:

Theoretical: Theoretical probabilities are based on the assumption that all

outcomes occur _____, meaning all outcomes are equally likely.

Formula: If all outcomes are equally likely, then the theoretical probability of event A, denoted P(A), is

_____

Examples:

(a)   What is the probability of getting heads if you flip a coin one time?   _____

(b)   What is the probability of rolling a 3 if you roll a die one time?   _____

(c)   What is the probability of getting a king if you draw one card from a standard deck of cards?   _____

(d)   What is the probability of rolling a 9 if you roll a die one time?   _____

(e)   A jar contains 5 red, 6 blue and 4 yellow marbles. Find the probability of getting a blue marble when you pick one marble from the jar.   _____

(f)   A dart board is made up of 3 concentric circles with radii of 2in, 4in, and 6in. If one dart is thrown, what is the probability of hitting the center circle (bull's-eye)?

_____
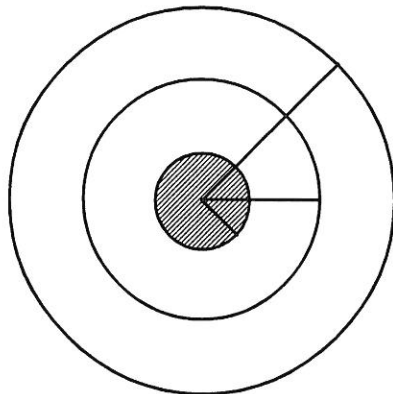
6.   The second type of probability is Experimental:

Experimental: Experimental probability is approximated by performing trials and recording the ratio of the number of occurrences of the event to the number of trials.

Examples:

(a)   A single coin was flipped 10 times. The results are listed below. What is the experimental probability of getting heads?   _____

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(b)   A single die was rolled 20 times. The results are listed below. What is the experimental probability of getting an odd number?   _____

6, 2, 3, 4, 3, 2, 3, 4, 3, 2, 4, 4, 2, 2, 6, 3, 2, 1, 6, 3

III.   The Fundamental Counting Principle

1.   **The Fundamental Counting Principle:**

If there are **m** ways that one event can occur and **n** ways that another event can occur, then

there are _____ ways that both events can occur.

2.   Examples:

(a)   At lunch students have 3 choices for a main dish; fish, chicken, or beef. They also have 2 choices for a side dish; fries or baked potato. How many different lunches can be made? Make a tree diagram and a list to show the options.

(b)   You need to choose a PIN number for your bank card. It must be 4 numerical digits. How many different PIN numbers can be made?

_____

(c)   If a license plate has 2 letters and 3 numbers, how many different plates can be made?

_____

(d)   In the situation from part (c), what is the probability that the 2 letters on your license plate are your initials?

_____

(e)   You have a 10 question true/false test that you forgot to study for so you will have to guess at the answers. What is the probability you get all the answers right?

_____