

Name: _____

Date: _____

Probability----Review Sheet

A. PROBABILITY (DEFINITION): _____

B. Where is probability used: _____

Theoretical Probability (Formula): $\frac{\text{number of ways the event can occur}}{\text{Total number of possible outcomes}}$

Sample questions:

1. A single die is rolled. Find the probability of rolling a:

a. 5 b. an even number c. a number > 4

d. a prime number e. an odd number < 3

C. $P(\text{not } A) = 1 - P(A)$

$P(\text{certain event}) =$ _____ **$P(\text{impossible event}) =$ _____**

Exercises:

2. The probability of rain is $\frac{1}{3}$. What is the probability of *no* rain?

3. A die is rolled. What is the probability of obtaining a number:

- a. less than 7? _____ b. greater than 7? _____

D. $P(A \text{ or } B) =$ _____

4. The mail contained 2 letters, 3 bills, and 5 ads. Mr. Jacobsen picked up the first piece of mail without looking at it. Express, in fractional form, the probability that this piece of mail is:

- a. a letter b. a bill c. an ad
- d. a letter or an ad e. a bill or an ad f. not a bill
- g. not an ad h. a bill and an ad

5. An outfit consists of a shirt and a pair of pants. There are 4 different shirts and 3 different pairs of pants.

- a. Represent all different outfits by a **TREE**

DIAGRAM

- b. List the ordered pairs
- c. How many outcomes in the sample space?

E. **THE COUNTING PRINCIPLE:** If one event can occur in any of “m” ways, and following this, a second activity can occur in any of “n” ways, then both activities can occur in _____

Exercises:

- 6. A lunch menu consists of 3 appetizers, 5 main dishes and 1 dessert. How many different meals that have one appetizer, one main dish and one dessert are possible?

F. **INDEPENDENT EVENTS** -when the results of one activity in no way influence the result of a second activity

A COMPOUND EVENT consists of two or more independent events .

ex. rolling 2 dice, tossing 3 coins, spinning an arrow 5 times

The counting principle can be used to find the probability that two independent events occur at the same time:

When two events E and F are independent, and when the probability of event E is m ($0 \leq m \leq 1$) and the probability of event F is n ($0 \leq n \leq 1$), then the probability of the compound event in which E and F occur jointly is the product $m \cdot n$

Examples:

7. The probability that the Bears will beat the Eagles is $\frac{1}{2}$. The probability that the Bears will beat the Cubs is $\frac{3}{5}$.

a. What is the probability that the Bears will win both games?

b. What is the probability that the Bears will lose both games?

c. What is the probability that the Bears will beat the Eagles, but lose to the Cubs?

8. A single die is rolled twice. What is the probability of obtaining a "3" on the first roll and then a "4" on the second roll?

9. If a coin is tossed and then a die is rolled, what is the probability of getting a head and a number *less* than 3? _____

G. PROBABILITY WITH AND WITHOUT REPLACEMENT!

In 10-12, there are 3 black marbles, 4 red marbles, 2 white marbles, and one green marbles in an urn. One marble is drawn at random, its color noted, and the marble is returned. A second marble is drawn at random and its color is noted. What is the probability that:

10. both marbles are red? _____

11. the first marble is red and the second marble is green? _____

12. neither marble is red? _____
More review!

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1. On two successive rolls of a die, what is the probability that:
a. both numbers will be even

- a. the first is even and the second is odd _____

2. The probability that an event will *not* occur is $\frac{7}{12}$. What is the probability that the event will occur? _____

3. A die is rolled. What is the probability of rolling an even number less than 5? _____

4. There are three ways of going from town A to town B and six way of going from town B to town C. Find the total number of ways in which a person can go from town A to town B to town C.

5. If all seven letters of the word "REGENTS" were placed in a hat, what would be the probability of drawing an E on the first draw? _____

6. An urn contains 3 red marbles and two green marbles. One marble is randomly selected, its color noted, and it is *not* replaced. A second marble is then selected and its color is noted.

a. Draw a tree diagram or list the sample space showing all possible outcomes.

b. Find the probability that:

1. both marbles are green _____
 2. neither marble is green _____
 3. at least one marble is green _____
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