

GEOOMETRY

Unit 12

Collage of math worksheets including:

- SETS**: Notes on finite and infinite sets, and a definition: "Define each set and classify it." Example: "1. The set of states beginning with the letter M is very useful."
- EXPERIMENT**: Section for recording experimental results.
- OUTCOME**: Section for recording possible outcomes.
- SAMPLE SPACE**: Section for defining the sample space.
- Theoretical PROBABILITY**: Notes on probability formulas. Formula: $P(E) = \frac{\text{\# of favorable outcomes}}{\text{total \# of outcomes}}$. Example: "a) P(multiple of 3)"
- GEOMETRIC PROBABILITY**: Notes on probability with lengths. Example: "1. Point X is randomly placed on a line segment AB. The probability that the segment AX is less than the length of AB is..." Includes a number line diagram.
- CONDITIONAL PROBABILITY**: Notes on conditional probability. Formula: "Conditional Probability Formula: $P(A|B) = \frac{P(A \cap B)}{P(B)}$ ". Example: "Use for questions 1-4: A number from 1-20 is chosen at random. 1. P(prime > 10) 2. P(odd > 10)"
- TWO-WAY TABLE**: A survey table showing gender and dominant writing hand.

	Left-Handed	Right-Handed	Total
Male	7	48	
Female	9	86	
Total			

PROBABILITY

NOTES • HOMEWORK • QUIZZES • TEST

Created by: ALL THINGS ALGEBRA®

Unit 12 - Probability: Sample Unit Outline

	TOPIC	HOMEWORK
DAY 1	Introduction to Set Theory; Venn Diagrams	HW #1
DAY 2	Sample Space and Counting Outcomes; Simple Theoretical & Experimental Probability	HW #2
DAY 3	Geometric Probability	HW #3
DAY 4	Quiz 12-1	None
DAY 5	Compound Probability: Independent and Dependent Events	HW #4
DAY 6	Conditional Probability	HW #5
DAY 7	Two-Way Tables	HW #6
DAY 8	Quiz 12-2	None
DAY 9	Permutations and Combinations	HW #7
DAY 10	Probability using Permutations and Combinations	↓
DAY 11	Unit 12 Review	Study for Test
DAY 12	UNIT 12 TEST	None

Name: _____ Date: _____

Topic: _____

Main Ideas/Questions	Notes/Examples
SETS	<ul style="list-style-type: none"> A set is a _____ Each object is called an _____ A _____ set and elements are listed _____ The set with no elements (or null set) and denoted _____ <p>NOTE: A finite set has a distinct (countable) number of elements. An infinite set does not have a distinct number of elements.</p> <p>Define each set and classify it.</p> <ol style="list-style-type: none"> The set of states beginning with _____ The set of prime numbers _____

Name: _____ Date: _____

Topic: _____

Main Ideas/Questions	Notes/Examples
COMPOUND Probability	<p>Example: _____</p> <ul style="list-style-type: none"> Events are independent if the outcome of one event does not affect the outcome of another event.

Name: _____ Date: _____

Topic: _____

Main Ideas/Questions	Notes/Examples
FACTORIAL	<ul style="list-style-type: none"> The factorial of a number n, written as _____, is the product of all natural numbers from 1 to n. Example: Find $8!$ (Read as 8 factorial) <p>$8! =$ _____</p> <p>Evaluate each expression.</p> <ol style="list-style-type: none"> $6!$ $13!$ $\frac{18!}{10!}$ $0!$

Main Ideas/Questions	Notes/Examples
PERMUTATION	<p>A permutation is an arrangement or line up of objects.</p> <p>(This means, for example, the arrangements _____ are unique even though they contain the same objects.)</p> <p>Permutation Formula: $nPr =$ _____</p> <p>n = total number of objects available r = number of objects to use for the arrangement</p> <p>*Important Shortcut: $nPn =$ _____</p>

Main Ideas/Questions	Notes/Examples
PERMUTATION Examples	<p>Represent each problem as a permutation, then solve.</p> <ol style="list-style-type: none"> How many ways can the letters in the word EDUCATION be arranged? How many ways can the letters in the word MEADOW be arranged if the first letter must be M? How many ways can Jeremiah arrange 7 books on a shelf? There are 10 dogs in a dog show. How many ways can they be awarded first, second, and third place?

Name: _____ Date: _____

Topic: _____

Main Ideas/Questions	Notes/Examples
COMBINATIONS & Probability	<p>Use for questions 7-10: There are 4 and 3 senior clarinet players in the band. Randomly select two to lead practice, find each probability.</p> <ol style="list-style-type: none"> Both are juniors. One is a freshman and the other is a sophomore.

Name: _____ Date: _____

Topic: _____ Class: _____

Main Ideas/Questions	Notes/Examples
Theoretical PROBABILITY	<ul style="list-style-type: none"> Probability is a measure of the _____ that a _____ will occur. When all outcomes are equally likely, the theoretical probability of an event E is the ratio of the number of favorable outcomes to the total number of outcomes. <p>$P(E) = \frac{\text{\# of favorable outcomes}}{\text{Total \# of outcomes}}$</p>

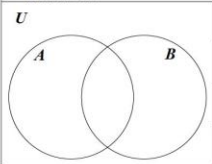
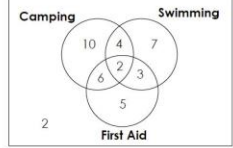
Name: _____ Date: _____

Topic: _____ Class: _____

Main Ideas/Questions	Notes/Examples
CONDITIONAL Probability	<ul style="list-style-type: none"> Given events A and B, the probability of event B occurring given that event A has occurred is called conditional probability. Notation: _____ — Read as "the probability of _____ given _____" <p>Conditional Probability Formula: _____</p> <p>Use for questions 1-4: A number from 1-20 is chosen at random.</p>

Name: _____ Date: _____

Topic: _____

Main Ideas/Questions	Notes/Examples
EXAMPLES	<p>Topic #1: Sets & Venn Diagrams</p> <ol style="list-style-type: none"> Suppose a universal set consists of the multiples of 3 that are no more than 15. Set A contains the even numbers, and set B contains the numbers that are greater than 15. Complete the Venn diagram to the left, then answer the questions.  <p>a) U b) A c) B</p> <p>d) A' e) B'</p> <p>f) $A \cap B$ g) $A \cup B$</p> <ol style="list-style-type: none"> The Venn Diagram below shows the number of boy scouts in a certain troop who have earned the following merit badges: camping, swimming, and first aid.  <p>a. How many boy scouts have earned the camping badge?</p> <p>b. How many boy scouts have earned the swimming badge or the first aid badge?</p> <p>c. How many boy scouts have earned the camping badge and the swimming badge?</p> <p>d. How many boy scouts have earned the swimming badge and the first aid badge?</p> <p>e. How many boy scouts have earned the camping badge and the first aid badge?</p> <p>f. How many boy scouts have earned all three merit badges?</p>

Main Ideas/Questions	Notes/Examples
EXAMPLES	<p>Topic #2: Counting Principle</p> <ol style="list-style-type: none"> Guests at a wedding have an appetizer choice of soup or a salad, an entrée choice of chicken, steak, or vegetarian, then a dessert choice of vanilla or chocolate cake. How many different meals are possible? A date in the month of February is chosen. How many different dates are possible? Misha is rating an aerobics class. There are six categories and each category can be rated from one to four stars. How many ways can she rate the class? The spinner to the right is spun twice, then a card from a standard deck is chosen at random. How many different outcomes are possible?

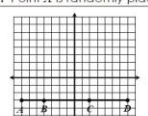
Name: _____ Date: _____

Topic: _____

Main Ideas/Questions	Notes/Examples																
EXAMPLES	<p>1. The two-way table below shows the results from a survey in which students were asked for gender (male/female) and their dominant writing hand (left/right).</p> <table border="1"> <thead> <tr> <th></th> <th>Left-Handed</th> <th>Right-Handed</th> <th>Total</th> </tr> </thead> <tbody> <tr> <th>Male</th> <td>10</td> <td>15</td> <td>25</td> </tr> <tr> <th>Female</th> <td>5</td> <td>20</td> <td>25</td> </tr> <tr> <th>Total</th> <td>15</td> <td>35</td> <td>50</td> </tr> </tbody> </table> <p>1. The two-way table below shows the results from a survey in which students were asked for gender (male/female) and their dominant writing hand (left/right).</p>		Left-Handed	Right-Handed	Total	Male	10	15	25	Female	5	20	25	Total	15	35	50
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Name: _____ Date: _____

Topic: _____ Class: _____

Main Ideas/Questions	Notes/Examples
GEOMETRIC Probability	<p>Probability with LENGTHS</p> <p>The probability that a point falls on a certain portion of a segment is the ratio of the length of the favorable segment to the length of the entire segment.</p> <p>1. Point X is randomly placed on \overline{AD} below. Find each probability.</p>  <p>a) $P(X \text{ is on } \overline{CD})$</p> <p>b) $P(X \text{ is on } \overline{AC})$</p>

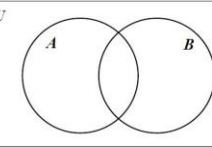
Name: _____ Date: _____

Topic: _____ Class: _____

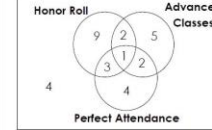

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Name: _____ Date: _____

Topic: _____

Main Ideas/Questions	Notes/Examples
UNIT 12 Test Study Guide (Probability)	<p>Topic #1: Sets & Venn Diagrams</p> <ol style="list-style-type: none"> A universal set contains odd natural numbers from 1-25. The following two subsets are created from the universal set: <ul style="list-style-type: none"> Set A contains numbers that are no more than 12 Set B contains numbers that are prime Place each element of the universal set in the Venn diagram to the right.  List the elements in each of the following sets using the universal set above. <ol style="list-style-type: none"> A' B' $A \cap B$ $A \cup B$

Main Ideas/Questions	Notes/Examples
UNIT 12 Test Study Guide (Probability)	<p>Topic #2: Counting Principle</p> <ol style="list-style-type: none"> Guests at a wedding have an appetizer choice of soup or a salad, an entrée choice of chicken, steak, or vegetarian, then a dessert choice of vanilla or chocolate cake. How many different meals are possible? A date in the month of February is chosen. How many different dates are possible? Misha is rating an aerobics class. There are six categories and each category can be rated from one to four stars. How many ways can she rate the class? The spinner to the right is spun twice, then a card from a standard deck is chosen at random. How many different outcomes are possible?

Main Ideas/Questions	Notes/Examples
UNIT 12 Test Study Guide (Probability)	<p>Topic #3: Probability</p> <ol style="list-style-type: none"> Suppose a universal set consists of the multiples of 3 that are no more than 15. Set A contains the even numbers, and set B contains the numbers that are greater than 15. Complete the Venn diagram to the left, then answer the questions. The Venn Diagram below shows the number of students in Mrs. Crane's homeroom who were on Honor Roll, taking advanced classes, or had perfect attendance for the first quarter.  <ol style="list-style-type: none"> How many students are taking advanced classes? How many students are on Honor Roll or had perfect attendance? How many students are taking advanced classes and on Honor Roll, but did not have perfect attendance? The spinner below is spun two times. How many different outcomes are possible?  <ol style="list-style-type: none"> 36 252 324 378 A brand of jeans comes in nine different washes, five different fit styles, and three different height options. If two of the wash options are out of stock, how many ways can someone order a single pair of jeans? <ol style="list-style-type: none"> 95 105 120 15

Name: _____ Date: _____

Topic: _____