1)Let's Go over homework.

2)Quiz that won't be counted but you need to do your best.

3) New notes (seniors work on their review - Final at the end of this week.

Probability

- Probability is a numerical measure that indicates the likelihood of an event.
- All probabilities are   er   inclusive.
- A probability of 0 means the event is

- A probability of 1 means the event is

- Events with probabilities near 1 are

Probability

- Events can be named with capital letters: A, B, C…

- P(A) means the probability of A occurring.
  - P(A) is read "P of A"
  - $0 \leq P(A) \leq 1$

Probability

- independent trials - the outcome of one trial doesn't influence or change the outcome of another.
- For example, coin flips are independent.

Probability: Assignment By Relative Frequency
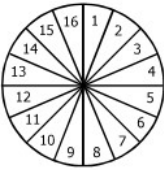
- P(A) = Relative Frequency = $\dfrac{f}{n}$

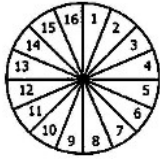 *f* is the frequency of the event.

  n is the sample size.

  – Example: We flip a fair penny 200 times and heads comes up 104 times.

  – P(heads) = $\dfrac{104}{200} = .52$

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Theoretical Probability	• Probability is the measure of how _____ an event is to occur. • The set of all possible outcomes is called the **sample space.** • For equally likely outcomes, the theoretical probability of an event, $P(E)$, is the _____ of the number of favorable outcomes to the total number of outcomes possible.
Simple Events The probability of one event.	**1.** A jar contains 32 red marbles and 28 blue marbles. What is the probability that a randomly selected marble is red? **2.** A letter in the word **RESTORATION** is randomly selected. What is the probability of selecting a vowel? **3.** A day in the month of January is randomly selected. What is the probability of selecting a prime number? **4.** Two dice are rolled. What is the probability that the sum of the two dice on the next roll is at least 9? **5.** What is the probability of drawing a heart or a club from a standard deck of cards? **6.** There are 8 books lettered A-H on the shelf. If Scott randomly chose two books, what is the probability that he chose books A and B?
Complement of an Event	The complement of an event is the probability of the event _____ happening. Since the sum of all probabilities in sample space is _____, the probability of an event not happening is $P(\sim E) =$ _____. **7.** The probability that it will snow tomorrow is 7/20. What is the probability that it will not snow? **8.** A month of the year is randomly selected. What is the probability of getting a month that does not begin with the letter A? **9.** If the spinner to the left is spun, find the probability that it lands on a number that is not prime. **10.** Two dice are rolled. What is the probability of not getting doubles?

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Theoretical Probability	• Probability is the measure of how __likely__ an event is to occur. • The set of all possible outcomes is called the **sample space**. • For equally likely outcomes, the theoretical probability of an event, $P(E)$, is the __ratio__ of the number of favorable outcomes to the total number of outcomes possible.

Simple Events The probability of one event.	1. A jar contains 32 red marbles and 28 blue marbles. What is the probability that a randomly selected marble is red? $\dfrac{32}{60} = \boxed{\dfrac{8}{15}}$	2. A letter in the word **RESTORATION** is randomly selected. What is the probability of selecting a vowel? $\boxed{\dfrac{5}{11}}$
	3. A day in the month of January is randomly selected. What is the probability of selecting a prime number? $\boxed{\dfrac{11}{31}}$	4. Two dice are rolled. What is the probability that the sum of the two dice on the next roll is at least 9? $\dfrac{10}{36} = \boxed{\dfrac{5}{18}}$
	5. What is the probability of drawing a heart or a club from a standard deck of cards? $\dfrac{26}{52} = \boxed{\dfrac{1}{2}}$	6. There are 8 books lettered A–H on the shelf. If Scott randomly chose two books, what is the probability that he chose books A and B? $\dfrac{1}{{}_8C_2} = \boxed{\dfrac{1}{28}}$

Complement of an Event	The complement of an event is the probability of the event __not__ happening. Since the sum of all probabilities in sample space is __1__, the probability of an event not happening is $P(\sim E) =$ __$1 - P(E)$__.

	7. The probability that it will snow tomorrow is 7/20. What is the probability that it will not snow? $1 - \dfrac{7}{20} = \boxed{\dfrac{13}{20}}$	8. A month of the year is randomly selected. What is the probability of getting a month that does not begin with the letter A? $1 - \dfrac{2}{12} = \boxed{\dfrac{5}{6}}$
	9. If the spinner to the left is spun, find the probability that it lands on a number that is not prime. $1 - \dfrac{10}{16} = \boxed{\dfrac{3}{4}}$	10. Two dice are rolled. What is the probability of not getting doubles? $1 - \dfrac{6}{36} = \boxed{\dfrac{5}{6}}$

Compound Events	Independent Events	Dependent Events
The probability of two or more simple events.	When the outcome of one event <u>does not affect</u> the outcome of the other event. $P(A \text{ and } B) =$	When the outcome of one event <u>does affect</u> the outcome of the other event. $P(A \text{ and } B) =$
Independent Events	**11.** A die is rolled 3 times. What is the probability of getting 1's on each roll?	**12.** A coin is tossed, then a day of the week is selected. What is the probability of getting tails then a day starting with the letter T?

A bag contains 8 red crayons, 14 purple crayons, 6 yellow crayons, and 4 green crayons. A crayon is selected, replaced, then another is selected. Find each probability.

13. P(purple then yellow)	**14.** P(green then red)
15. P(two purples)	**16.** P(two yellows)

Dependent Events

Using the same example from above, assume once a crayon is selected, it is NOT replaced. Find each probability.

17. P(yellow then red)	**18.** P(purple then green)
19. P(two reds)	**20.** P(two greens)
21. A card is drawn from a standard deck, not replaced, and another is drawn. What is the probability of choosing a heart then a spade?	**22.** Jack had four Snicker bars and 8 Mars bars. He randomly chose a piece of candy, ate it, then chose another. What is the probability that both candy bars were Snickers?

Compound Events The probability of two or more simple events.	Independent Events When the outcome of one event <u>does not affect</u> the outcome of the other event. $P(A \text{ and } B) =$ $P(A) \cdot P(B)$	Dependent Events When the outcome of one event <u>does affect</u> the outcome of the other event. $P(A \text{ and } B) =$ $P(A) \cdot P(B, \text{after } A \text{ occured})$
Independent Events	11. A die is rolled 3 times. What is the probability of getting 1's on each roll? $\frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6} = \boxed{\frac{1}{216}}$	12. A coin is tossed, then a day of the week is selected. What is the probability of getting tails then a day starting with the letter T? $\frac{1}{2} \cdot \frac{2}{7} = \boxed{\frac{1}{7}}$
	A bag contains 8 red crayons, 14 purple crayons, 6 yellow crayons, and 4 green crayons. A crayon is selected, replaced, then another is selected. Find each probability.	
	13. $P(\text{purple then yellow})$ $\frac{14}{32} \cdot \frac{6}{32} = \boxed{\frac{21}{256}}$	14. $P(\text{green then red})$ $\frac{4}{32} \cdot \frac{8}{32} = \boxed{\frac{1}{32}}$
	15. $P(\text{two purples})$ $\frac{14}{32} \cdot \frac{14}{32} = \boxed{\frac{49}{256}}$	16. $P(\text{two yellows})$ $\frac{6}{32} \cdot \frac{6}{32} = \boxed{\frac{9}{256}}$
Dependent Events	Using the same example from above, assume once a crayon is selected, it is NOT replaced. Find each probability.	
	17. $P(\text{yellow then red})$ $\frac{6}{32} \cdot \frac{8}{31} = \boxed{\frac{3}{62}}$	18. $P(\text{purple then green})$ $\frac{14}{32} \cdot \frac{4}{31} = \boxed{\frac{7}{124}}$
	19. $P(\text{two reds})$ $\frac{8}{32} \cdot \frac{7}{31} = \boxed{\frac{7}{124}}$	20. $P(\text{two greens})$ $\frac{4}{32} \cdot \frac{3}{31} = \boxed{\frac{3}{248}}$
	21. A card is drawn from a standard deck, not replaced, and another is drawn. What is the probability of choosing a heart then a spade? $\frac{13}{52} \cdot \frac{13}{51} = \boxed{\frac{13}{204}}$	22. Jack had four Snicker bars and 8 Mars bars. He randomly chose a piece of candy, ate it, then chose another. What is the probability that both candy bars were Snickers? $\frac{4}{12} \cdot \frac{3}{11} = \boxed{\frac{1}{11}}$

Name: _____   **Unit 11:** Probability & Statistics

Date: _____ **Bell:** _____   **Homework 2:** Theoretical Probability

** This is a 2-page document! **

Part I: Simple Probability

Use for questions 1-3: A random two-digit number (10-99) is drawn. Find each probability.

1. $P(32)$	2. $P(\text{odd number})$	3. $P(\text{a multiple of 5})$

Use for questions 4-6: A letter is randomly chosen from the word CANDLESTICK.
Find each probability.

4. $P(\text{a vowel})$	5. $P(N \text{ or } S)$	6. $P(\text{not } C)$

7. Three coins are tossed. Find the probability that two land on heads.	8. A month is randomly chosen. What is the probability that the month chosen has less than 31 days?
9. What is the probability of drawing a 9 or diamond from a standard deck of cards?	10. Credit cards place a three-digit security code on the back of cards. What is the probability that a code starts with the number 7?
11. Two dice are rolled. What is the probability of not getting doubles?	12. Mikayla has the following songs on her iPod: 14 Taylor Swift songs, 16 Meghan Trainor songs, and 17 Katy Perry songs. What is the probability that the next song that plays is not Katy Perry?

Part II: Compound Probability

13. A dice is rolled, then a coin is tossed. What is the probability of getting a 5 then tails?	14. A coin is tossed, then a number 1-10 is chosen at random. What is the probability of getting heads then a number less than 4?

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Name: _____   Unit 11: Probability & Statistics

Date: _____ Bell: _____   Homework 2: Theoretical
                                                      Probability

** This is a 2-page document! **

Part I: Simple Probability

Use for questions 1-3: A random two-digit number (10-99) is drawn. Find each probability.

1. $P(32)$	2. P(odd number)	3. P(a multiple of 5)
$\boxed{\dfrac{1}{90}}$	$\dfrac{45}{90} = \boxed{\dfrac{1}{2}}$	$\dfrac{18}{90} = \boxed{\dfrac{1}{5}}$

Use for questions 4-6: A letter is randomly chosen from the word CANDLESTICK. Find each probability.

4. P(a vowel)	5. $P(N \text{ or } S)$	6. P(not C)
$\boxed{\dfrac{3}{11}}$	$\boxed{\dfrac{2}{11}}$	$1 - \dfrac{2}{11} = \boxed{\dfrac{9}{11}}$

7. Three coins are tossed. Find the probability that two land on heads. H H H T H H H H T T T H H T H T H T H T T T T T $\boxed{\dfrac{3}{8}}$	8. A month is randomly chosen. What is the probability that the month chosen has less than 31 days? $1 - \dfrac{7}{12} = \boxed{\dfrac{5}{12}}$
9. What is the probability of drawing a 9 or diamond from a standard deck of cards? $\dfrac{16}{52} = \boxed{\dfrac{4}{13}}$	10. Credit cards place a three-digit security code on the back of cards. What is the probability that a code starts with the number 7? $\dfrac{1 \cdot 10 \cdot 10}{10 \cdot 10 \cdot 10} = \boxed{\dfrac{1}{10}}$
11. Two dice are rolled. What is the probability of not getting doubles? $1 - \dfrac{6}{36} = \boxed{\dfrac{5}{6}}$	12. Mikayla has the following songs on her iPod: 14 Taylor Swift songs, 16 Meghan Trainor songs, and 17 Katy Perry songs. What is the probability that the next song that plays is not Katy Perry? $1 - \dfrac{17}{47} = \boxed{\dfrac{30}{47}}$

Part II: Compound Probability

13. A dice is rolled, then a coin is tossed. What is the probability of getting a 5 then tails? $\dfrac{1}{6} \cdot \dfrac{1}{2} = \boxed{\dfrac{1}{12}}$	14. A coin is tossed, then a number 1-10 is chosen at random. What is the probability of getting heads then a number less than 4? $\dfrac{1}{2} \cdot \dfrac{3}{10} = \boxed{\dfrac{3}{20}}$

15. Natalie guessed on the last four true or false questions on her math quiz. What is the probability that she got all four questions correct?	**16.** A card is drawn from a standard deck and a letter is chosen from the word **INCREDIBLE.** What is the probability of drawing a king then getting an I?

Use for questions 17-20: A bag contains 30 lottery balls numbered 1-30. A ball is selected, replaced, then another is drawn. Find each probability.

17. P(and even, then odd)	**18.** P(7, then a number greater than 16)
19. P(a multiple of 5, then a prime number)	**20.** P(two even numbers)

Use for questions 21-24: A bag contains 30 lottery balls numbered 1-30. A ball is selected, NOT replaced, then another is drawn. Find each probability.

21. P(a 2-digit number, then 4)	**22.** P(19, then a multiple of 4)
23. P(24, then a number less than 15)	**24.** P(two perfect squares)
25. A football team has 5 freshman, 8 sophomores, 11 juniors, and 16 seniors. If two are chosen at random to participate in the coin toss, what the probability that both players chosen will be seniors?	**26.** Ryan's mom randomly chooses two days each week for Ryan to do his chores. What is the probability that she picks Saturday and Sunday?

15. Natalie guessed on the last four true or false questions on her math quiz. What is the probability that she got all four questions correct? $$\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \left(\frac{1}{2}\right)^4 = \boxed{\frac{1}{16}}$$	**16.** A card is drawn from a standard deck and a letter is chosen from the word **INCREDIBLE.** What is the probability of drawing a king then getting an I? $$\frac{4}{52} \cdot \frac{2}{10} = \boxed{\frac{1}{65}}$$

Use for questions 17-20: A bag contains 30 lottery balls numbered 1-30. A ball is selected, replaced, then another is drawn. Find each probability.

17. P(and even, then odd) $$\frac{15}{30} \cdot \frac{15}{30} = \boxed{\frac{1}{4}}$$	**18.** P(7, then a number greater than 16) $$\frac{1}{30} \cdot \frac{14}{30} = \boxed{\frac{7}{450}}$$
19. P(a multiple of 5, then a prime number) $$\frac{6}{30} \cdot \frac{10}{30} = \boxed{\frac{1}{15}}$$	**20.** P(two even numbers) $$\frac{15}{30} \cdot \frac{15}{30} = \boxed{\frac{1}{4}}$$

Use for questions 21-24: A bag contains 30 lottery balls numbered 1-30. A ball is selected, NOT replaced, then another is drawn. Find each probability.

21. P(a 2-digit number, then 4) $$\frac{21}{30} \cdot \frac{1}{29} = \boxed{\frac{7}{290}}$$	**22.** P(19, then a multiple of 4) $$\frac{1}{30} \cdot \frac{7}{29} = \boxed{\frac{7}{870}}$$
23. P(24, then a number less than 15) $$\frac{1}{30} \cdot \frac{14}{29} = \boxed{\frac{7}{435}}$$	**24.** P(two perfect squares) $$\frac{5}{30} \cdot \frac{4}{29} = \boxed{\frac{2}{87}}$$
25. A football team has 5 freshman, 8 sophomores, 11 juniors, and 16 seniors. If two are chosen at random to participate in the coin toss, what the probability that both players chosen will be seniors? $$\frac{16}{40} \cdot \frac{15}{39} = \boxed{\frac{2}{13}}$$	**26.** Ryan's mom randomly chooses two days each week for Ryan to do his chores. What is the probability that she picks Saturday and Sunday? $$\frac{2}{7} \cdot \frac{1}{6} = \boxed{\frac{1}{21}}$$