Counting / Probability Worksheet 3A2

Name _____

(1) _____ The number n is randomly selected from the set $\{1, 2, ..., 10\}$, with each number being equally likely. What is the probability that $2n - 4 > n$? Express your answer as a common fraction.

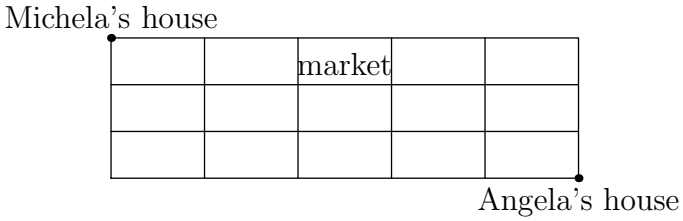
(2) _____ P and Q are whole numbers such that $0 < P < 10$ and $0 < Q < 10$. How many common fractions $\frac{P}{Q}$ exist if $\frac{1}{2} < \frac{P}{Q} < 1$?

(3) _____ The digits from 1 to 6 are arranged to form a six-digit multiple of 5. What is the probability that the number is greater than 500,000? Express your answer as a common fraction.

(4) _____ Ms. Albertson is randomly selecting the order in which her 25 students will each present a report next week. Five students will present each day, Monday through Friday. What is the probability that the shortest student will present his report on Thursday? Express your answer as a common fraction.

(5) _____ What is the positive difference between the probability of a fair coin landing heads up exactly 2 times out of 3 flips and the probability of a fair coin landing heads up 3 times out of 3 flips? Express your answer as a common fraction.

(6) _____ Michela wants to go from her house to Angela's house, but she needs to stop at the market on the way. She may only travel to the right and down. What is the number of distinct paths that Michela can take?



(7) _____ Between 3:00 p.m. and 4:00 p.m., for what fractional part of the hour does the digit ″2″ appear on a 12-hour digital clock that shows hour and minutes? Express your answer as a common fraction.

(8) _____ Yuliya has a piece of meat which measures 5" x 6" x 8". In order to make a stew, she would like to cut pieces which measure 2" x 3" x 4". What is the maximum number of such pieces she can cut from this piece of meat?

(9) _____ Diane is writing a book with ten chapters, which have 17, 23, 14, 26, 21, 32, 36, 19, 24 and 30 pages, respectively. The first chapter begins on page 1, and each subsequent chapter must also begin on an odd numbered page, with a blank page between chapters if needed. What is the page number of the last page of the last chapter?

(10) _____ What is the units digit of $1! + 3! + 5! + 7! + 9! + 11!$?

(11) _____ How many distinct positive integers can be represented as the difference of two numbers in the set $\{1, 3, 5, 7, 9, 11, 13\}$?

(12) _____ A graphic art designer's annual salary is a whole number of dollars between \$62,400 and \$62,600. If the hundreds, tens and units digits in her salary are all different and in descending order, how many possibilities exist for her salary?

(13) _____ If two distinct numbers are selected at random from the first seven prime numbers, what is the probability that their sum is an even number? Express your answer as a common fraction.

(14) _____ The number 121 is a palindrome, because it reads the same backwards as forward. How many integer palindromes are between 100 and 500?

(15) _____ Ilian will randomly choose a value for p from the integers 0 through 13, inclusive, and will make $\frac{p}{13}$ the coordinate of point A. The coordinate of point B is $\frac{2}{3}$. Points A and B will be on the same number line. What is the probability that point A and point B will be less than $\frac{1}{5}$ of a unit from each other? Express your answer as a common fraction.

(16) _____ A digital, 12-hour clock shows hours and minutes. During what fraction of the day will the clock show the digit 1 in its display? Express your answer as a common fraction.

(17) _____ The first 20 numbers of an arrangement are shown below. What would be the value of the 40^{th} number if the arrangement were continued?

- Row 1: 2, 2
- Row 2: 4, 4, 4, 4
- Row 3: 6, 6, 6, 6, 6, 6
- Row 4: 8, 8, 8, 8, 8, 8, 8, 8

(18) _____ What is the probability of getting an even number when a fair six-sided die is rolled? Express your answer as a common fraction.

(19) _____ The product of the digits of 3214 is 24. How many distinct four-digit positive integers are such that the product of their digits equals 12?

(20) _____ Mr. Cortes is trying to determine where each student in his class should sit. He knows that he wants Abraham, Brian, Cynthia, Delia, Eugene, and Faye to sit in the six chairs in the first row. Using the following criteria, determine who sits next to Delia.

- Eugene sits next to Cynthia but not Faye.
- Abraham's nickname, ABE, appears in the seating chart if you only use the first letters of each person's name.
- Faye and Delia sit at each end.
- There are two seats between Delia and Eugene.

(21) _____ Two numbers are chosen at random, with replacement, from the set $\{1, 2, 3, 4\}$. The two numbers are used as the numerator and denominator of a fraction. What is the probability that the fraction represents a whole number? Express your answer as a common fraction.

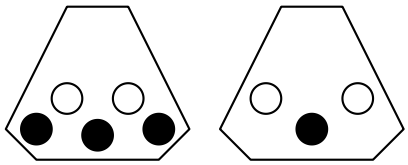
(22) _____ Chris sleeps from 10:30 p.m. to 6:30 a.m. At a random time during the night, he awakens and looks at his clock. What is the probability that it is before midnight? Express your answer as a common fraction.

(23) _____ Camy made a list of every possible distinct five-digit positive even integer that can be formed using each of the digits 1, 3, 4, 5 and 9 exactly once in each integer. What is the sum of the integers on Camy's list?

(24) _____ What is the greatest possible number of points of intersection for eight distinct lines in a plane?

(25) _____ What fraction of the eleven letters in the word "MISSISSIPPI" are I's? Express your answer as a common fraction.

(26) _____ Two bags of marbles are pictured below. One marble is randomly selected from Bag A and placed into Bag B. One marble is then randomly selected from Bag B. What is the probability that the marble selected from Bag B is black? Express your answer as a common fraction.



(27) _____ How many different four-digit numbers can be obtained by using any four of the digits 2, 3, 4, 4, and 4?

(28) _____ A printer is used to print out the squares of the first 15 positive integers. How many digits are printed by the printer?

(29) _____ How many diagonals does a regular seven-sided polygon contain?

(30) _____ If digits may not be repeated, how many positive three-digit integers can be written using the digits 1, 2, 3 and 4?