Counting / Probability Worksheet (3A1)
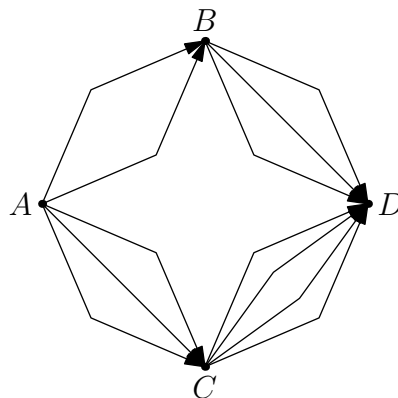
Name _____

(1) _____   The license plates for motor vehicles in a state have a sequence of three letters followed by three digits. How many license plates could start with MOM or POP?

(2) _____   How many sets of five paintings can a museum curator choose from a collection of eight paintings?

(3) _____   How many diagonals does a regular hexagon have?

(4) _____   How many different integers can be expressed as the sum of three different numbers in the set $\{1, 2, 3, 4, 5, 6, 7\}$?

(5) _____   Ohio entered the Union on March 1, 1803, which can be written as 3/1/03. The date 3/1/03 is a "friendly date" because the product of the month and day is equal to value of the last two digits of the year. How many friendly dates occur during the year 2009?

(6) _____   How many different isosceles triangles have integer side lengths and perimeter of 81 units?

(7) _____   A five-digit number is called a mountain number if the first three digits increase and the last three digits decrease. For example, $35,763$ is a mountain number but $35,663$ is not. How many five-digit numbers greater than $70,000$ are mountain numbers?

(8) _____   Three standard dice are tossed. What is the probability that the sum of the numbers on the tops of the three dice is 17 or greater? Express your answer as a common fraction.

(9) _____   During the monsoon season, torrential rainstorms occur. In how many distinct ways can the letters of MONSOON be arranged?

(10) _____   A basketball player makes her free throws 55% of the time. What is the probability that she will make both of her next two free throws? Express your answer as a common fraction.

(11) _____   Merina's annual salary is a whole number of dollars between $42,400 and $42,500. The digits in the hundreds, tens and units places are in strictly ascending order. How many distinct possibilities exist for her annual salary?

(12) _____   There are 14 red, 10 yellow, 5 green and 3 purple candies in a bag. What is the probability that a candy chosen at random is not red? Express your answer as a common fraction.

(13) _____   A school is creating a four-digit student code system. For security reasons, the code cannot start with an even number. How many codes are possible?

(14) _____   Following the arrows, how many different routes are there from A to D?

(15) _____   The perimeter of a square lot is lined with trees, and there are three yards between the centers of adjacent trees. There are eight trees on a side, and a tree is at each corner. What is the number of yards in the perimeter of the lot?

(16) _____   What percent of the integers from 1 to 100 inclusive has at least one digit that is a 7?

(17) _____   Two different natural numbers are selected from the set $\{1, 2, 3, \ldots, 6\}$. What is the probability that the greatest common factor of these two numbers is one? Express your answer as a common fraction.

(18) _____   Compute: $\frac{(3!)^6}{(3!)^3}$.

(19) _____   A drawer contains 2 brown and 3 gray socks. The socks are taken out of the drawer one at a time. What is the probability that the fourth sock removed is gray? Express your answer as a common fraction.

(20) _____   A penny, a nickel and a dime are tossed simultaneously. What is the probability that exactly two of the coins show heads when they land? Express your answer as a common fraction.

(21) _____   The probability of rain tomorrow is $\frac{3}{10}$. What is the probability that it will not rain tomorrow? Express your answer as a common fraction.

(22) _____   In a science class of 16 students, 11 students are on the basketball team, and 7 students are on the track team. What is the least number of students in this class who are on both teams?

(23) _____   Morgan has 3 hockey shirts, 2 football shirts and 7 baseball shirts in her closet. If she randomly selects one of these shirts, what is the probability that it will not be a baseball shirt? Express your answer as a common fraction.

(24) _____ In how many different ways can 30 cents be made from any combination of quarters, dimes, nickels or pennies?

(25) _____ A board game spinner is divided into three parts labeled A, B, and C. The probability of the spinner landing on A is 1/3 and on B is 5/12. What is the probability of the spinner landing on C? Express your answer as a common fraction.

(26) _____ Mr. Patrick is preparing a five-question true-false quiz for his class. He flips a coin before writing the first question. If it is heads, he writes a true statement and if it is tails, he writes a false statement. He continues this until all five statements are written. What is the probability that the correct sequence of answers is TFTFT ? Express your answer as a common fraction.

(27) _____ How many different four-digit numbers can be formed using each of the digits in 1999 exactly once?

(28) _____ A palindrome is a number that reads the same forward and backward. The year 1991 was the last palindromic year of the twentieth century. How many years between 2000 and 3000 are palindrome?

(29) _____ Eight women of different heights are at a party. Each woman decides to only participate in a handshake with women shorter than herself. How many handshakes take place?

(30) _____ The numbers 1 through 25 are written on 25 cards with one number on each card. Sara picks one of the 25 cards at random. What is the probability that the number on her card will be a multiple of 2 or 5? Express your answer as a common fraction.