

Puzzle Time

What Happens When You Throw A Clock In The Air?

Write the letter of each answer in the box containing the exercise number.

Find the number of possible outcomes in the sample space.

- You roll a die and flip two coins.
 - You draw two marbles without replacement from a bag containing four red marbles, two yellow marbles, and five blue marbles.
 - You flip six coins.
 - A bag contains eight black cards numbered 1 through 8 and six red cards numbered 1 through 6. You choose a card at random.
- Find the probability.
- You draw a number card from a standard deck of cards.
 - When two six-sided dice are rolled, there are 36 possible outcomes. Find the probability that the sum is less than 5.
 - In a classroom of 20 students, 12 students have brown hair, 4 students have blonde hair, 3 students have red hair, and one student has black hair. Find the probability of randomly selecting a blonde haired student from the classroom.

Answers

- P. $\frac{1}{5}$
 T. 24
 E. 14
 S. $\frac{9}{13}$
 I. 40
 M. 64
 U. $\frac{1}{6}$

13.2

Start Thinki

Abbey has applied for admit softball team is playing for t they will play for the state cl events (being accepted at her championship, and winning 1 Which are independent? Exp

13.2

Warm Up

A group of 128 students w high school sport: basketk The table shows the result probabilities that a studen group would prefer the foll

Survey Res		
basketball	football	lacrosse
48	35	

- lacrosse
- baseball or basketball
- one of the four sports

13.2

Cumulative F

Find the surface area and v

PERMUTATIONS AND COMBINATIONS WORKSHEET

1. If the NCAA has applications from 6 universities for hosting its intercollegiate tennis championships in 2008 and 2009, how many ways may they select the hosts for these championships
 - a) if they are not both to be held at the same university?
 - b) if they may both be held at the same university?
2. There are five finalists in the Mr. Rock Hill pageant. In how many ways may the judges choose a winner and a first runner-up?
3. In a primary election, there are four candidates for mayor, five candidates for city treasurer, and two candidates for county attorney. In how many ways may voters mark their ballots
 - a) if they vote in all three of the races?
 - b) if they exercise their right not to vote in any or all of the races?
4. A multiple-choice test consists of 15 questions, each permitting a choice of 5 alternatives. In how many ways may a student fill in the answers if they answer each question?
5. A television director is scheduling a certain sponsor's commercials for an upcoming broadcast. There are six slots available for commercials. In how many ways may the director schedule the commercials
 - a) If the sponsor has six different commercials, each to be shown once?
 - b) If the sponsor has three different commercials, each to be shown twice?
 - c) If the sponsor has two different commercials, each to be shown three times?
 - d) If the sponsor has three different commercials, the first of which is to be shown three times, the second two times, and the third once?
6. In how many ways may can five persons line up to get on a bus?
7. In how many ways may these same people line up if two of the people refuse to stand next to each other?
8. In how many ways may 8 people form a circle for a folk dance?
9. How many permutations are there of the letters in the word "great"?
10. How many permutations are there of the letters in the word "greet"?
11. How many distinct permutations are there of the word "statistics"?
12. How many distinct permutations of the word "statistics" begin and end with the letter "s"?

13. A college football team plays 10 games during the season. In how many ways can it end the season with 5 wins, 4 losses, and 1 tie?
14. If eight people eat dinner together, in how many different ways may 3 order chicken, 4 order steak, and 1 order lobster?
15. Suppose a True-False test has 20 questions.
 - a) In how many ways may a student mark the test, if each question is answered?
 - b) In how many ways may a student mark the test, if 7 questions are marked correctly and 13 incorrectly?
 - c) In how many ways may a student mark the test, if 10 questions are marked correctly and 10 incorrectly?
16. Among the seven nominees for two vacancies on the city council are three men and four women. In how many ways may these vacancies be filled
 - a) with any two of the nominees?
 - b) with any two of the women?
 - c) with one of the men and one of the women?
17. Mr. Jones owns 4 pairs of pants, 7 shirts, and 3 sweaters. In how many ways may he choose 2 of the pairs of pants, 3 of the shirts, and 1 of the sweaters to pack for a trip?
18. In how many ways may one A, three B's, two C's, and one F be distributed among seven students in a CTQR 150 class?
19. An art collector, who owns 10 original paintings, is preparing a will. In how many ways may the collector leave these paintings to three heirs?

20. A baseball fan has a pair of tickets to 6 different home games of the Chicago Cubs. If the fan has five friends who like baseball, how many ways may he take one of them along to each of the six games?

Simple Permutations and Combinations Worksheet

1. How many ways can you arrange the letters of the word FACTOR?
2. How many ways can you choose two jellybeans from a bag of 15?
3. How many ways can five different textbooks be arranged on a shelf?
4. How many groups of 3 toys can a child choose to take on a vacation from a toy box containing 11 toys?
5. How many different sets of 6 questions for a test can be chosen from a file containing 22 questions?
6. How many ways can Laura colour a map with 4 adjacent regions if she has 15 coloured pencils?
7. How many ways can a teacher select 5 students from a class of 23 students to create a bulletin board display?
8. There are seven children to be lined up in a straight line for a photograph
 - a) How many different ways are possible?
 - b) How many different ways are possible if Sally must be in the middle?
 - c) How many different ways are possible if Ahmed is on the far left?
 - d) How many different ways are possible if Hannah and Brian must be together?
9. A 12 set encyclopedia is to be arranged on a shelf. How many incorrect arrangements are possible?
10. A video store has 27 new release movie posters. How many ways can the manager choose 8 for a promotion that gives them away to the same person?
11. If you have a standard deck of cards in how many different ways can you deal out
 - a) 5 cards
 - b) 10 cards
 - c) 5 red cards
 - d) 4 queens
12. If you have a standard deck of cards in how many different hands exists of
 - a) 5 cards
 - b) 10 cards
 - c) 5 red cards
 - d) 4 queens
13. How many ways can 12 volleyball teams members line up if the captain and assistant captain must be together?
14. The game of euchre uses only 24 cards from a standard deck. How many different 5 card euchre hands are possible?
15. A club has 11 members.
 - a) How many different 2 member committees could be formed from this club?
 - b) How many different 3 member committees could be formed from this club?
 - c) How many ways could a president, treasurer and secretary be chosen?
16. How many ways can 7 people be arranged around a circular table?
17. Mr. Wilson has a briefcase with a three digit combination lock. He can set the combination himself. His favourite digits are 3,4,5,6 and 7. Each digit can be used at most once. He his only going to use these numbers for his combinations.

Independent and Dependent Events

Determine whether the scenario involves independent or dependent events.

- 1) You flip a coin and then roll a fair six-sided die. The coin lands heads-up and the die shows a one.
- 2) A bag contains eight red marbles and four blue marbles. You randomly pick a marble and then pick a second marble without returning the marbles to the bag. The first marble is red and the second marble is blue.
- 3) A box of chocolates contains five milk chocolates, five dark chocolates, and five white chocolates. You randomly select and eat three chocolates. The first piece is milk chocolate, the second is dark chocolate, and the third is white chocolate.
- 4) A cooler contains ten bottles of sports drink: four lemon-lime flavored, three orange flavored, and three fruit-punch flavored. Three times, you randomly grab a bottle, return the bottle to the cooler, and then mix up the bottles. The first time, you get a lemon-lime drink. The second and third times, you get fruit-punch.

Find the probability.

- 5) You flip a coin and then roll a fair six-sided die. The coin lands heads-up and the die shows an even number.
- 6) You roll a fair six-sided die twice. The first roll shows a five and the second roll shows a six.
- 7) There are eight shirts in your closet, four blue and four green. You randomly select one to wear on Monday and then a different one on Tuesday. You wear blue shirts both days.
- 8) A basket contains five apples and seven peaches. You randomly select one piece of fruit and eat it. Then you randomly select another piece of fruit. The first piece of fruit is an apple and the second piece is a peach.

Determine if events A and B are independent.

$$9) P(A) = \frac{2}{5} \quad P(B) = \frac{1}{5} \quad P(A \text{ and } B) = \frac{2}{25}$$

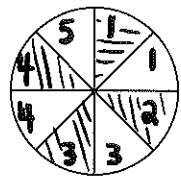
$$10) P(A) = \frac{2}{5} \quad P(B) = \frac{1}{4} \quad P(A \text{ and } B) = \frac{1}{25}$$

$$11) P(A) = \frac{9}{20} \quad P(B) = \frac{1}{2} \quad P(A|B) = \frac{27}{50}$$

$$12) P(\text{not } A) = \frac{3}{4} \quad P(B) = \frac{3}{10} \quad P(A \text{ and } B) = \frac{3}{40}$$

Conditional Probability Worksheet

1. Andrea is a very good student. The probability that she studies and passes her mathematics test is $\frac{17}{20}$. If the probability that Andrea studies is $\frac{15}{16}$, find the probability that Andrea passes her mathematics test, given that she has studied.
2. The probability that Janice smokes is $\frac{3}{10}$. The probability that she smokes and develops lung cancer is $\frac{4}{15}$. Find the probability that Janice develops lung cancer, given that she smokes.
3. The probability that Sue will go to Mexico in the winter and to France in the summer is 0.40. The probability that she will go to Mexico in the winter is 0.60. Find the probability that she will go to France this summer, given that she just returned from her winter vacation in Mexico.
4. A penny and a nickel are tossed. Find the probability that the penny shows heads, given that the nickel shows heads.
5. A penny is tossed. Find the probability that it shows heads. Compare this answer to your answer to #4 and explain the results.

6. A spinner with dial marked as shown is spun once. Find the probability that it points to an even number given that it points to a shaded region:
 - a) directly
 - b) using conditional probability formula
7. A family that is known to have two children is selected at random from amongst all families with two children. Find the probability that both children are boys, given that there is a boy in this family.
8. A die is tossed. Find $P(\text{less than } 5 | \text{even})$.