ANSWERS

A bag contains 2 green, 9 brown, 7 yellow, and 4 blue marbles. Once a marble is selected, it is not replaced. Find each probability.

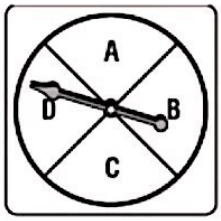
1. P(brown, then yellow) = $\frac{9}{22} \times \frac{7}{21} = \frac{3}{22}$
2. P(green, then blue) = $\frac{2}{22} \times \frac{4}{21} = \frac{4}{231}$
3. P(yellow, then yellow) = $\frac{7}{22} \times \frac{6}{21} = \frac{1}{11}$
4. P(blue, then blue) = $\frac{4}{22} \times \frac{3}{21} = \frac{2}{77}$
5. P(green, then NOT blue) = $\frac{2}{22} \times \frac{17}{21} = \frac{17}{231}$
6. P(brown, then NOT green) = $\frac{9}{22} \times \frac{19}{21} = \frac{57}{154}$

Using the same bag as above, this time the first marble IS replaced.

7. P(brown, then yellow) = $\frac{9}{22} \times \frac{7}{22} = \frac{63}{484}$
8. P(green, then blue) = $\frac{2}{22} \times \frac{4}{22} = \frac{2}{121}$
9. P(yellow, then yellow) = $\frac{7}{22} \times \frac{7}{22} = \frac{49}{484}$
10. P(blue, then blue) = $\frac{4}{22} \times \frac{4}{22} = \frac{4}{121}$
11. P(green, then NOT blue) = $\frac{2}{22} \times \frac{18}{22} = \frac{9}{121}$
12. P(brown, then NOT green) = $\frac{9}{22} \times \frac{20}{22} = \frac{45}{121}$

A six-sided die is rolled and a spinner (like the one at the below) is spun. Find each probability.

13. P(4 and A) = $\frac{1}{6} \times \frac{1}{4} = \frac{1}{24}$
14. P(even number and C) = $\frac{3}{6} \times \frac{1}{4} = \frac{1}{8}$
15. P(2 or 5 and B or D) = $\frac{2}{6} \times \frac{2}{4} = \frac{1}{6}$
16. P(a number less than 5 and B, C, or D) = $\frac{4}{6} \times \frac{3}{4} = \frac{1}{2}$



A bag contains 5 red M&Ms , 3 brown M&Ms, 6 yellow M&Ms, and 2 blue M&Ms. Once an M&M is selected, it is eaten.

17. P(brown, then yellow, then red) = $\frac{3}{16} \times \frac{6}{15} \times \frac{5}{14} = \frac{3}{112}$
18. P(red, then red, then blue) = $\frac{5}{16} \times \frac{4}{15} \times \frac{2}{16} = \frac{5}{504}$
19. P(yellow, then yellow, then not blue) = $\frac{6}{16} \times \frac{5}{15} \times \frac{12}{14} = \frac{3}{28}$
20. P(brown, then brown, then not red) = $\frac{3}{16} \times \frac{2}{15} \times \frac{9}{14} = \frac{9}{560}$

Act 5.1 The Fundamental Counting Principle **NAME:**_____

The FCP- the ability to determine how many ways certain choices can be made. When two or more choices must be made together we use the FCP. If one item can be selected m ways, and for each way a second item can be selected in n ways, then the two items can be selected m x n different ways. SHOW your work

1. A car model comes with the following choices: 9 colors, with or without air conditioning, with or without sunroof, with or without automatic transmission, with or without a spoiler, and with or without antilock brakes. In how many ways can the car be ordered?

$9 \times 2 \times 2 \times 2 \times 2 \times 2 = 288$

Color AC S A S B

2. You are about to take an 8 question multiple choice test. Each of these questions has 4 answers (A, B, C, or D). How many ways can you answer the test if you leave an answer for each question?

$4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4 = 65{,}536$

1 2 3 4 5 6 7 8

3. A social security number contains nine digits, such as 000-00-0000. How many different social security numbers can be formed using any numerals from 0 to 9?

$10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 = 1{,}000{,}000{,}000$

4. How many different four digit alarm codes can be formed for a house alarm? The first digit must be a 2, 4 or 9 and all the other digits can be any number and numbers can be repeated.

$3 \cdot 9 \cdot 8 \cdot 7 = 1{,}512$

5. How many 5 character license plates can be made if the first 3 characters are letters and last 2 characters are numbers? Repetition of characters is allowed but the first letter must be a P, W, Q, E, L, or K?

$\underset{L}{6} \cdot \underset{L}{26} \cdot \underset{L}{26} \cdot \underset{\#}{10} \cdot \underset{\#}{10} = 405{,}600$

6. Telephone numbers in the United States begin with 3 digit area codes followed by 7 digit local telephone numbers. **Area codes and local telephone numbers** cannon begin with 0 or 1. How many telephone numbers are possible?

$8 \ 10 \ 10 \cdot 8 \ 10 \ 10 \cdot 10 \ 10 \ 10 \ 10$

$6{,}400{,}000{,}000$

7. Shoppers in a large shopping mall are categorized as: **male or female**, over **30 or 30 and under**, and cash **or credit card shoppers**. In how many ways can the shoppers be categorized?

1 2 3

$2 \times 2 \times 2 = 8$

8. There are 8 horses in race, how many ways can they finish first, second and third?

$8 \cdot 7 \cdot 6 = 336$

9. A menu has 6 different sandwiches, with 3 choices of potato, 3 types of salad, and 5 different beverages. How many different lunches can be ordered consisting of a sandwich, potato, salad and beverage?

$6 \times 3 \times 3 \times 5 = 270$

10. Assume a postal code consists of 6 characters. Each character can be any letter from A to Z or any numeral from 0 to 9. How many postal codes are possible in this situation?

$36 \cdot 36 \cdot 36 \cdot 36 \cdot 36 \cdot 36 = 2,176,782,336$

11. A lock uses the letters A through H on the first dial and the digits 0 through 9 on the second and third dials.

a) How many possible codes are there for this lock?

$8 \quad 10 \quad 10 = 800$

b) How many possible codes are there if the same number is not used twice?

$8 \times 10 \times 9 = 720$

12. In how many ways can a teacher seat 5 girls and 3 boys in a row of 8 seats if a boy must be seated in the first seat and a girl in the last seat?

Boys Girls

$3 \quad 2 \quad 1 \quad 4 \quad 3 \quad 2 \quad 1 \quad 5 = 720$

B G

13. Draw a tree diagram of all the possible outcomes there are when a coin is flipped in the air and dice is rolled at the same time.

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