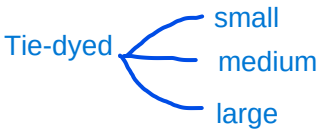
NAME Selda Ocal

Lesson 2.1 Tree Diagrams

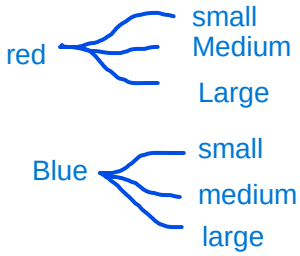
Solve each problem. Express probabilities as fractions in simplest form.

1. A store sells T-shirts in the colors and sizes shown in the chart. Make a tree diagram.

Colors	Sizes
red	small
blue	medium
tie-dyed	large



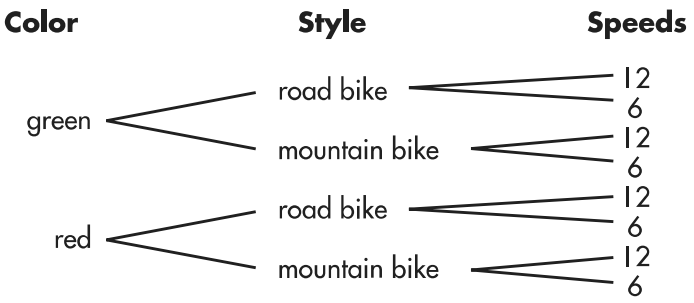
Tree Diagram



a. There are 9 possible outcomes, or choices, of T-shirts.

b. Suppose the store has just 1 of each size and color. If you select a T-shirt at random, the probability that you will choose a large shirt is 1/3.

2. The tree diagram below shows the combinations of colors, styles, and speeds of bicycles available at a bicycle shop. You select one at random.



a. There are 8 combinations of bicycles from which to choose.

b. The probability of choosing a green bicycle is 1/2.

c. The probability of choosing a 6-speed mountain bicycle is 1/4.

d. The probability of choosing a red, 12-speed road bicycle is 1/8.

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Lesson 2.2 Calculating Probability

A **compound event** consists of two or more events. Tossing two coins is a compound event. Tossing a coin and rolling a die is also a compound event.

Compound events are **independent** if the outcome of one event does not influence the outcome of the others. When you flip a coin, there is a $\frac{1}{2}$ probability of heads and a $\frac{1}{2}$ probability of tails. Suppose your coin flip produces tails. If you flip the coin again, there is still a $\frac{1}{2}$ probability of heads and a $\frac{1}{2}$ probability of tails. These events are independent.

If events A and B are independent, then the probability of both occurring is:

$P(A) \times P(B)$

The probability of getting tails in one coin flip is $\frac{1}{2}$. The probability of getting a 5 in one roll of a die is $\frac{1}{6}$. The probability of both occurring, {tails, 5}, is $\frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$.

Determine each probability. Express your answer as a fraction in simplest form.

1. Events E and F are independent. The probability that E will occur is $\frac{2}{5}$. The probability that F will occur is $\frac{3}{7}$. What is the probability that both E and F will occur?

   The probability that both E and F will occur is _____.

2. A nationwide poll found that 3 of 5 voters planned to vote for Candidate X. Jay and Aisha voted. What is the probability that both voted for Candidate X?

   The probability that both voted for Candidate X is _____.

3. You roll a 6-sided die and flip a coin. What is the probability of getting an even number on the die and heads on the coin?

   P(even) and P(heads) is 1/4.

4. A jar of jellybeans has 6 blue, 2 orange, and 8 red jellybeans. You choose 1 jellybean, put it back, and then choose another. What is the probability that you choose 2 blue jellybeans?

   The probability of choosing 2 blue jellybeans is 9/64.

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Lesson 2.2 Calculating Probability

Two events are **dependent** if the outcome of one event influences the outcome of the other. If events A and B are dependent, then the probability of both occurring is:

$$P(A) \times P(B \text{ after A occurs})$$

Suppose a bag holds 2 yellow golf balls and 2 white golf balls. Each color of ball has a $\frac{2}{4}$ or $\frac{1}{2}$ chance of being selected. You take a yellow ball out of the bag and do not replace it. Now, there are 2 white balls and 1 yellow ball. The probability of choosing a white ball next is $\frac{2}{3}$. Therefore, the probability of choosing a yellow ball, P(A), and then a white ball, P(B after A occurs), is $\frac{1}{2} \times \frac{2}{3} = \frac{2}{6} = \frac{1}{3}$.

Determine each probability. Express your answer as a fraction in simplest form.

1. A jar of jellybeans has 6 blue, 2 orange, and 8 red jellybeans. You choose 1 jellybean and eat it. You then choose another and eat it. What is the probability that you ate 2 blue jellybeans?

   The probability that you ate 2 blue jellybeans is _____.

2. A bowl contains 20 raffle tickets, including 1 winning ticket. You take 1 ticket from the bowl. Your friend then takes 1 ticket from the bowl. What are the chances that both you and your friend picked losing tickets?

   The probability of both of you picking losing tickets is _____.

3. A box holds 5 electronic games. Two of the games are defective. You take 1 game from the box. Without replacing it, you choose another game from the box. How likely is it that you picked 2 defective games?

   There is a 1/10 probability that both games are defective.

4. A set of 12 cards contains an equal number of clubs, diamonds, hearts, and spades. You take 3 cards in a row from the set without replacing them. What are the chances that all three are spades?

   The probability of 3 spades is 1/220.

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Lesson 2.3 Understanding Compound Events

The **Fundamental Counting Principle** states that when an experiment has an event with more than one part, the number of possible outcomes is calculated by looking at the number of possible outcomes for each part. An event with more than one part is considered **a compound event**. The number of possible outcomes for the first element (a) can be multiplied by the number of possible outcomes for the second element (b) to find the total number of possible outcomes (o). So, $a \times b = o$.

There are 3 balls (yellow, red, and green) in one bag and 4 balls (purple, blue, white, and black) in another bag. If a person draws one ball from each bag, how many possible outcomes are there?

Step 1:	Find the number of outcomes for the first event.	3
Step 2:	Find the number of outcomes for the second event.	4
Step 3:	Multiply these together.	3×4
Step 4:	State the number of possible outcomes for the combined event.	12

Use the Fundamental Counting Principle to find the number of possible outcomes for each compound event described.

	a	b
1.	rolling two dice that are numbered 1–6 36	flipping a coin and rolling a die numbered 1–6 12
2.	spinning a 4-part spinner and flipping a coin 8	pulling a card from a full deck and flipping a coin 104
3.	spinning a 6-part spinner and rolling a die numbered 1–6 36	flipping a coin and rolling two dice numbered 1–6 72
4.	spinning a 4-part spinner and pulling a card from a full deck 208	flipping 2 coins and rolling 2 dice numbered 1–6 144