

Tree Diagrams and the Counting Principle

COURSE 1 LESSON 10-1

Problem of the Day

Grace is tying carnations into bunches of one dozen. If she has 336 carnations, how many bunches can she make? Will she have any carnations left over? Explain.

28 bunches; none left over; 336 is divisible by 12.

MAIN MENU



LESSON



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What You've Learned

In chapter 5 and 6 you learned to write equivalent fractions and to add, subtract and multiply fractions.

In Chapter 7, you used ratios to describe proportional relationships, and you solved problems.

You also converted between decimals, fractions, and percents.



What You'll Learn Next

In this Chapter, you will construct sample spaces using lists and tree diagrams.

You will find the probabilities of a simple event and of its complement

You will also find experimental probabilities.

You will use probabilities and proportions to make predictions about populations.



Vocabulary Review

1. When you multiply, you can group numbers together using the ? *Property*. **Associative**

Find each product.

2. $5 \times 0.52 \times 2$ **5.2**

3. $25 \times 1.8 \times 40$ **1,800**

4. $3 \times 0.4 \times 1000$ **1,200**

 Check Skills You'll Need



What You'll Learn

To construct sample spaces for events and to use the counting principle.

Why Learn This?

A coin toss is used in sporting events to decide which team starts with the ball. If you toss a coin once, there are two possible outcomes – heads or tails. An outcome is the result of an action



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Under Miscellaneous

Outcome – the result of an action.

Event – is an outcome or group of outcomes.

Sample space – the set of all possible outcomes

Tree diagram – an organized list of all possible outcomes

Counting principle – the way to find the number of possible outcomes.

Permutation – an arrangement of objects in a particular order



Additional Examples

1 EXAMPLE

A snack food company makes bags of potato chips in two different sizes and four different flavors. Construct a sample space to find out how many choices there are.

Assign each option a variable.



Flavors	Sizes	
	Small	Large
1	small, 1	large, 1
2	small, 2	large, 2
3	small, 3	large, 3
4	small, 4	large, 4

List all the possible outcomes. → Sm1, Sm2, Sm3, Sm4, Lg1, Lg2, Lg3, Lg4

The number of choices or possible outcomes is 8.

 **Quick Check**



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Additional Examples

Quick Check

2 EXAMPLE Suppose you spin a spinner with 5 equal-sized sections numbered 1 through 5. You then toss a coin. What is the probability that you will get an even number and heads? Make a tree diagram to find all possible outcomes.

The diagram shows 10 equally likely outcomes. There are 2 outcomes where an even number is paired with heads.

So $P(\text{even number, then heads}) = \frac{2}{10}$, or $\frac{1}{5}$.

Spinner	Coin	Outcome
1	H	1H
	T	1T
2	H	2H
	T	2T
3	H	3H
	T	3T
4	H	4H
	T	4T
5	H	5H
	T	5T



Additional Examples

3 EXAMPLE Flight attendants can wear one of four shirts, three pants, and two jackets. How many different combinations of uniforms are possible?

Use the counting principle to find the total number of uniforms.

$$\begin{array}{ccccccc} \text{Shirts} & & \text{Pants} & & \text{Jackets} & & \text{Uniforms} \\ \downarrow & & \downarrow & & \downarrow & & \downarrow \\ 4 & \times & 3 & \times & 2 & = & 24 \end{array}$$

There are 24 different uniform combinations.

 **Quick Check**



Closure

What does a tree diagram show?

An organized list of all possible outcomes.

What is the counting principle?

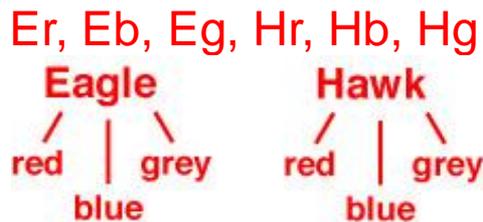
The number of outcomes for an event with two or more distinct stages is the product of the number of outcomes at each stage.



Lesson Quiz

A new line of mountain bikes has two different models—Eagle and Hawk—and three possible colors—red, blue, and grey.

1. Construct a sample space. Then, use a tree diagram to show all possible combinations.



2. Find the number of choices of bikes if wheels come in two options—aluminum or plastic.

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Class Work

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Home Work

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