Objective Simplifying Expressions to Solve Problems

Warm-Up

Simplify each expression.

1. $-20 \div 2\left(7\frac{2}{3}\right)$

2. $-20 - 2\left(-7\frac{2}{3}\right)$

3. $-7\left(\dfrac{\frac{3}{4}}{\frac{2}{3}}\right)$

Orville and Wilbur

In the middle of December 1903, two brothers—Orville and Wilbur Wright—became the first two people to make a controlled flight in a powered plane. They made four flights on December 17, the longest covering only 852 feet and lasting just 59 seconds.

The table shows information about the flights made that day.

	Pilot	Flight Time (s)	Distance (ft)
A	Orville	12	120
B	Wilbur	13	175
C	Orville	15	200
D	Wilbur	59	852

1. Determine the approximate speed of all four flights, in miles per hour.

Human flight progressed amazingly quickly after those first flights. In the year before Orville Wright died, Chuck Yeager had already piloted the first flight that went faster than the speed of sound: 767.269 miles per hour!

2. What is the speed of sound in feet per second?

In order to build a balsa wood model of the Wright brothers' plane, you would need to cut long lengths of wood spindles into shorter lengths for the wing stays, the vertical poles that support and connect the two wings. Each stay for the main wings of the model needs to be cut $3\frac{1}{4}$ inches long.

Show your work and explain your reasoning.

1. If the wood spindles are each 10 inches long, how many stays could you cut from one spindle?

2. How many inches of the spindle would be left over?

3. If the wood spindles are each 12 inches long, how many stays could you cut from one spindle?

4. How many inches of the spindle would be left over?

You also need to cut vertical stays for the smaller wing that are each $1\frac{5}{8}$ inches long.

5. If the wood spindles are each 10 inches long, how many of these stays could you cut from one spindle?

6. How many inches of the spindle would be left over?

7. If the wood spindles are each 12 inches long, how many stays could you cut from one spindle?

8. How many inches of the spindle would be left over?

9. Which length of spindle should be used to cut each of the different stays so that there is the least amount wasted?

There are longer spindles that measure 36 inches.

1. How much of a 36-inch-long spindle would be left over if you cut one of the stays from it?

2. How much of this spindle would be left over if you cut two of the stays from it?

3. Define variables and write and equation for the number of $3\frac{1}{4}$ -inch stays and the amount of the 36-inch spindle left over.

4. Use your equation to calculate the amount of the spindle left over after cutting 13 stays.

LESSON 6.3a
Building a Wright Brothers' Flyer

Objective Simplifying Expressions to Solve Problems

Review

Convert each fraction to a decimal. Classify the decimal as terminating or non-terminating and, if applicable, repeating or non-repeating.

1. $\frac{11}{12}$

2. $\frac{11}{14}$

Determine each absolute value. Show your work.

3. $|-5 - (-7)|$

4. $\left|-\frac{3}{8} + \frac{1}{6}\right|$

Determine each quotient.

5. $\frac{3}{4} \div \frac{4}{3}$

6. $\frac{1}{8} \div \frac{1}{5}$