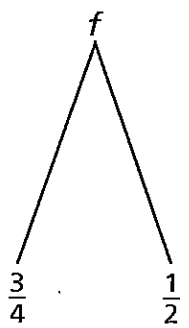
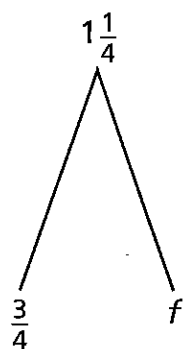
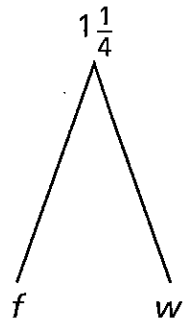


## Addition and Subtraction Problem Types

	Result Unknown	Change Unknown	Start Unknown
<b>Add to</b>	<p>A glass contained <math>\frac{2}{3}</math> cup of orange juice. Then <math>\frac{1}{4}</math> cup of pineapple juice was added. How much juice is in the glass now?</p> <p><i>Situation and solution equation:<sup>1</sup></i>  <math>\frac{2}{3} + \frac{1}{4} = c</math></p>	<p>A glass contained <math>\frac{2}{3}</math> cup of orange juice. Then some pineapple juice was added. Now the glass contains <math>\frac{11}{12}</math> cup of juice. How much pineapple juice was added?</p> <p><i>Situation equation:</i>  <math>\frac{2}{3} + c = \frac{11}{12}</math>  <i>Solution equation:</i>  <math>c = \frac{11}{12} - \frac{2}{3}</math></p>	<p>A glass contained some orange juice. Then <math>\frac{1}{4}</math> cup of pineapple juice was added. Now the glass contains <math>\frac{11}{12}</math> cup of juice. How much orange juice was in the glass to start?</p> <p><i>Situation equation</i>  <math>c + \frac{1}{4} = \frac{11}{12}</math>  <i>Solution equation:</i>  <math>c = \frac{11}{12} - \frac{1}{4}</math></p>
<b>Take from</b>	<p>Micah had a ribbon <math>\frac{5}{6}</math> yard long. He cut off a piece <math>\frac{1}{3}</math> yard long. What is the length of the ribbon that is left?</p> <p><i>Situation and solution equation:</i>  <math>\frac{5}{6} - \frac{1}{3} = r</math></p>	<p>Micah had a ribbon <math>\frac{5}{6}</math> yard long. He cut off a piece. Now the ribbon is <math>\frac{1}{2}</math> yard long. What is the length of the ribbon he cut off?</p> <p><i>Situation equation:</i>  <math>\frac{5}{6} - r = \frac{1}{2}</math>  <i>Solution equation:</i>  <math>r = \frac{5}{6} - \frac{1}{2}</math></p>	<p>Micah had a ribbon. He cut off a piece <math>\frac{1}{3}</math> yard long. Now the ribbon is <math>\frac{1}{2}</math> yard long. What was the length of the ribbon he started with?</p> <p><i>Situation equation:</i>  <math>r - \frac{1}{3} = \frac{1}{2}</math>  <i>Solution equation:</i>  <math>r = \frac{1}{2} + \frac{1}{3}</math></p>

<sup>1</sup>A situation equation represents the structure (action) in the problem situation. A solution equation shows the operation used to find the answer.

Answer

	Total Unknown	Addend Unknown	Both Addends Unknown
<b>Put Together/ Take Apart</b>	<p>A baker combines <math>\frac{3}{4}</math> cup of white flour and <math>\frac{1}{2}</math> cup of wheat flour. How much flour is this altogether?</p> <p><i>Math drawing:</i><sup>2</sup></p>  <p><i>Situation and solution equation:</i>  <math>\frac{3}{4} + \frac{1}{2} = f</math></p>	<p>Of the <math>1\frac{1}{4}</math> cups of flour a baker uses, <math>\frac{3}{4}</math> cup is white flour. The rest is wheat flour. How much wheat flour does the baker use?</p> <p><i>Math drawing:</i></p>  <p><i>Situation equation:</i>  <math>1\frac{1}{4} = \frac{3}{4} + f</math>  <i>Solution equation:</i>  <math>f = 1\frac{1}{4} - \frac{3}{4}</math></p>	<p>A baker uses <math>1\frac{1}{4}</math> cups of flour. Some is white flour and some is wheat flour. How much of each type of flour does the baker use?</p> <p><i>Math drawing:</i></p>  <p><i>Situation equation</i>  <math>1\frac{1}{4} = f + w</math></p>

<sup>2</sup>These math drawings are called math mountains in Grades 1–3 and break-apart drawings in Grades 4 and 5.

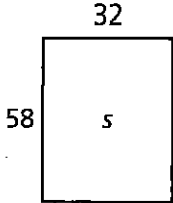
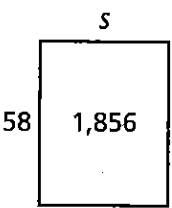
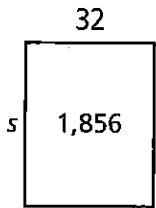
# Problem Types (continued)

## Addition and Subtraction Problem Types

	Difference Unknown	Greater Unknown	Smaller Unknown
Additive Comparison <sup>1</sup>	<p><b>Using "More"</b></p> <p>At a zoo, the female rhino weighs <math>1\frac{3}{4}</math> tons. The male rhino weighs <math>2\frac{1}{2}</math> tons. How much more does the male rhino weigh than the female rhino?</p>	<p><b>Leading Language</b></p> <p>At a zoo, the female rhino weighs <math>1\frac{3}{4}</math> tons. The male rhino weighs <math>\frac{3}{4}</math> tons more than the female rhino. How much does the male rhino weigh?</p>	<p><b>Leading Language</b></p> <p>At a zoo, the male rhino weighs <math>2\frac{1}{2}</math> tons. The female rhino weighs <math>\frac{3}{4}</math> tons less than the male rhino. How much does the female rhino weigh?</p>
	<p><b>Using "Less"</b></p> <p>At a zoo, the female rhino weighs <math>1\frac{3}{4}</math> tons. The male rhino weighs <math>2\frac{1}{2}</math> tons. How much less does the female rhino weigh than the male rhino?</p>	<p><b>Misleading Language</b></p> <p>At a zoo, the female rhino weighs <math>1\frac{3}{4}</math> tons. The female rhino weighs <math>\frac{3}{4}</math> tons less than the male rhino. How much does the male rhino weigh?</p>	<p><b>Misleading Language</b></p> <p>At a zoo, the male rhino weighs <math>2\frac{1}{2}</math> tons. The male rhino weighs <math>\frac{3}{4}</math> tons more than the female rhino. How much does the female rhino weigh?</p>
	<p><i>Math drawing:</i></p> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"><math>2\frac{1}{2}</math></div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 5px;"><math>1\frac{3}{4}</math></div> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; margin-left: 5px;"><math>d</math></div> </div> </div> <p><i>Situation equation:</i></p> $1\frac{3}{4} + d = 2\frac{1}{2} \text{ or}$ $d = 2\frac{1}{2} - 1\frac{3}{4}$ <p><i>Solution equation:</i></p> $d = 2\frac{1}{2} - 1\frac{3}{4}$	<p><i>Math drawing:</i></p> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"><math>m</math></div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 5px;"><math>1\frac{3}{4}</math></div> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; margin-left: 5px;"><math>\frac{3}{4}</math></div> </div> </div> <p><i>Situation and solution equation:</i></p> $1\frac{3}{4} + \frac{3}{4} = m$	<p><i>Math drawing:</i></p> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"><math>2\frac{1}{2}</math></div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 5px;"><math>f</math></div> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; margin-left: 5px;"><math>\frac{3}{4}</math></div> </div> </div> <p><i>Situation equation</i></p> $f + \frac{3}{4} = 2\frac{1}{2} \text{ or}$ $f = 2\frac{1}{2} - \frac{3}{4}$ <p><i>Solution equation:</i></p> $f = 2\frac{1}{2} - \frac{3}{4}$

<sup>1</sup>A comparison sentence can always be said in two ways. One way uses *more*, and the other uses *fewer* or *less*. Misleading language suggests the wrong operation. For example, it says the *female rhino weighs  $\frac{3}{4}$  tons less than the male*, but you have to add  $\frac{3}{4}$  tons to the female's weight to get the male's weight

## Multiplication and Division Problem Types<sup>1</sup>

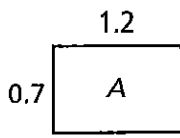
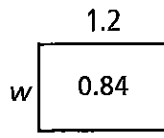
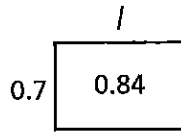
	Unknown Product	Group Size Unknown	Number of Groups Unknown
Equal Groups	<p>Maddie ran around a <math>\frac{1}{4}</math>-mile track 16 times. How far did she run?</p> <p><i>Situation and solution equation:</i>  <math>n = 16 \cdot \frac{1}{4}</math></p>	<p>Maddie ran around a track 16 times. She ran 4 miles in all. What is the distance around the track?</p> <p><i>Situation equation:</i>  <math>16 \cdot n = 4</math></p> <p><i>Solution equation:</i>  <math>n = 4 \div 16</math></p>	<p>Maddie ran around a <math>\frac{1}{4}</math>-mile track. She ran a total distance of 4 miles. How many times did she run around the track?</p> <p><i>Situation equation</i>  <math>n \cdot \frac{1}{4} = 4</math></p> <p><i>Solution equation:</i>  <math>n = 4 \div \frac{1}{4}</math></p>
	Unknown Product	Unknown Factor	Unknown Factor
Arrays <sup>2</sup>	<p>An auditorium has 58 rows with 32 seats in each row. How many seats are in the auditorium?</p> <p><i>Math drawing:</i></p>  <p><i>Situation and solution equation:</i>  <math>s = 58 \cdot 32</math></p>	<p>An auditorium has 58 rows with the same number of seats in each row. There are 1,856 seats in all. How many seats are in each row?</p> <p><i>Math drawing:</i></p>  <p><i>Situation equation:</i>  <math>58 \cdot s = 1,856</math></p> <p><i>Solution equation:</i>  <math>s = 1,856 \div 58</math></p>	<p>The 1,856 seats in an auditorium are arranged in rows of 32. How many rows of seats are there?</p> <p><i>Math drawing:</i></p>  <p><i>Situation equation</i>  <math>s \cdot 32 = 1,856</math></p> <p><i>Solution equation:</i>  <math>s = 1,856 \div 32</math></p>

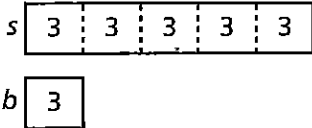
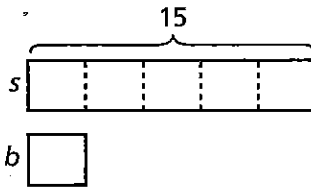
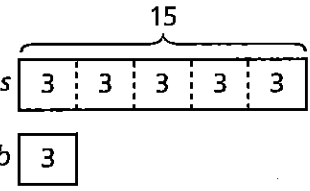
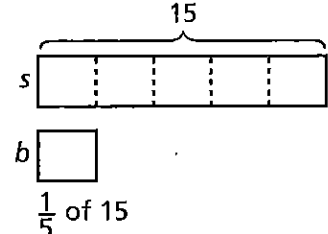
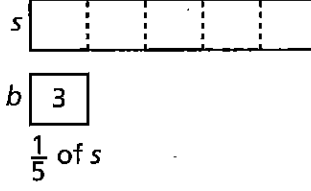
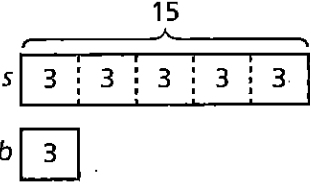
<sup>1</sup>In Grade 5, students solve three types of fraction division problems: 1) They divide two whole numbers in cases where the quotient is a fraction; 2) They divide a whole number by a unit fraction; 3) They divide a unit fraction by a whole number. Fraction division with non-unit fractions is introduced in Grade 6.

<sup>2</sup>We use rectangle models for both array and area problems in Grades 5 and 6 because the numbers in the problems are too large to represent with arrays.

## Problem Types (continued)

### Multiplication and Division Problem Types

	Unknown Product	Unknown Factor	Unknown Factor
	<p>A poster has a length of 1.2 meters and a width of 0.7 meter. What is the area of the poster?</p>	<p>A poster has an area of 0.84 square meters. The length of the poster is 1.2 meters. What is the width of the poster?</p>	<p>A poster has an area of 0.84 square meters. The width of the poster is 0.7 meter. What is the length of the poster?</p>
	<p><i>Math drawing:</i></p>	<p><i>Math drawing:</i></p>	<p><i>Math drawing:</i></p>
Area			
	<p><i>Situation and solution equation:</i>  <math>A = 1.2 \cdot 0.7</math></p>	<p><i>Situation equation:</i>  <math>1.2 \cdot w = 0.84</math>  <i>Solution equation:</i>  <math>w = 0.84 \div 1.2</math></p>	<p><i>Situation equation:</i>  <math>l \cdot 0.7 = 0.84</math>  <i>Solution equation:</i>  <math>l = 0.84 \div 0.7</math></p>

	Unknown Product	Unknown Factor	Unknown Factor
Multiplicative Comparison	<p><b>Whole Number Multiplier</b></p> <p>Sam has 5 times as many goldfish as Brady has. Brady has 3 goldfish. How many goldfish does Sam have?</p> <p><i>Math drawing:</i></p>  <p><i>Situation and solution equation:</i></p> $s = 5 \cdot 3$	<p><b>Whole Number Multiplier</b></p> <p>Sam has 5 times as many goldfish as Brady has. Sam has 15 goldfish. How many goldfish does Brady have?</p> <p><i>Math drawing:</i></p>  <p><i>Situation equation:</i></p> $5 \cdot b = 15$ <p><i>Solution equation:</i></p> $b = 15 \div 5$	<p><b>Whole Number Multiplier</b></p> <p>Sam has 15 goldfish. Brady has 3 goldfish. The number of goldfish Sam has is how many times the number Brady has?</p> <p><i>Math drawing:</i></p>  <p><i>Situation equation</i></p> $n \cdot 3 = 15$ <p><i>Solution equation:</i></p> $n = 15 \div 3$
	<p><b>Fractional Multiplier</b></p> <p>Brady has <math>\frac{1}{5}</math> times as many goldfish as Sam has. Sam has 15 goldfish. How many goldfish does Brady have?</p> <p><i>Math drawing:</i></p>  <p><i>Situation and solution equation:</i></p> $b = \frac{1}{5} \cdot 15$	<p><b>Fractional Multiplier</b></p> <p>Brady has <math>\frac{1}{5}</math> times as many goldfish as Sam has. Brady has 3 goldfish. How many goldfish does Sam have?</p> <p><i>Math drawing:</i></p>  <p><i>Situation equation:</i></p> $\frac{1}{5} \cdot s = 3$ <p><i>Solution equation:</i></p> $s = 3 \div \frac{1}{5}$	<p><b>Fractional Multiplier</b></p> <p>Sam has 15 goldfish. Brady has 3 goldfish. The number of goldfish Brady has is how many times the number Sam has?</p> <p><i>Math drawing:</i></p>  <p><i>Situation equation:</i></p> $n \cdot 15 = 3$ <p><i>Solution equation:</i></p> $n = 3 \div 15$