Part of a Whole

Summary
Fractions show up everywhere! People use them every day in activities like cooking, carpentry, sewing, and driving. Cooking involves using measurements of ingredients given in fractions, such as 1/2 cup flour or 1/4 teaspoon of salt. In construction, precise measurements are important when building houses or cutting lumber for a project. A driver needs to know what distances, such as a half-mile or quarter-mile, represent. Chemists use fractions to measure the right amount of a chemical to use with other ingredients to create a compound. If you think about it, you probably come in contact with fractions even more than you do whole numbers!

This activity is designed to explore some common applications of fractions.

Workplace Readiness Skill
Mathematics: Uses mathematical reasoning to accomplish tasks.

Workplace Readiness Definition
- using mathematical reasoning and processes to accomplish job-specific tasks (e.g., using graphs and charts to estimate expenditures for a construction job, using decimals and percentages in retail applications)
- making calculations related to personal finance (e.g., wage rates, paycheck deductions, taxes)

Vocabulary
Fraction
Numerator
Denominator
Mixed Number
Improper Fraction

Context Questions
- Have you ever had to do any calculations with fractions?
- Can you think of some instances when you used fractions?
- Can you name some occupations that make use of fractions?

Guidelines
1. Look up the vocabulary terms. Make sure that you understand each one.
2. Prerequisite Knowledge/Skills
   You should be able to:
   - Add, subtract, multiply, and divide using fractions
   - Solve simple equations
3. Complete the Part of a Whole exercise.
Evaluation

Check your work by referring to the Part of a Whole Key.

Reflection after Completion

- Did you solve all or most of the problems correctly?
- Which ones were the most difficult for you?
- Were you able to apply the technique for solving word problems?
- What are the benefits of knowing how to work with fractions?

Resources:

If you need a review of fractions or more practice, go to:

http://www.mathsisfun.com/fractions-menu.html
### Part of a Whole

**A. These are multiple choice items. Solve the problem and circle the correct answer.**

<table>
<thead>
<tr>
<th>Item #</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The Longview Shores swimming pool is $2\frac{1}{2}$ times as long as it is wide. There are 6 swimming lanes running the length of the pool. Each lane is 6 feet wide. What is the length of the pool?</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td></td>
<td>A. 30 ft.</td>
</tr>
<tr>
<td></td>
<td>B. 36 ft.</td>
</tr>
<tr>
<td></td>
<td>C. 51 ft.</td>
</tr>
<tr>
<td></td>
<td>D. 90 ft.</td>
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<td>Miriam has a custard recipe that requires 1 cup of sugar, 6 eggs, 3 cups of milk, and 1 teaspoon of vanilla. But she has only 4 eggs. She decides to adjust the recipe to the 4 eggs. How much milk will she need?</td>
</tr>
<tr>
<td></td>
<td>A. 2 cups</td>
</tr>
<tr>
<td></td>
<td>B. 3 cups</td>
</tr>
<tr>
<td></td>
<td>C. 1 cups</td>
</tr>
<tr>
<td></td>
<td>D. 4 cups</td>
</tr>
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<td>3.</td>
<td>In a school with 350 students, $\frac{3}{7}$ of the students are boys. How many boys attend the school?</td>
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<td>A. 110</td>
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<td>B. 125</td>
</tr>
<tr>
<td></td>
<td>C. 140</td>
</tr>
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<td>D. 150</td>
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</table>
4. Beth walked \( \frac{3}{4} \) of a mile yesterday and \( 1 \frac{1}{2} \) miles today. How far did she walk in total?
   - A. \( 1 \frac{3}{4} \)
   - B. \( 2 \frac{1}{4} \)
   - C. \( 2 \frac{1}{2} \)
   - D. \( 3 \frac{1}{4} \)

5. Carlos is putting ceiling tiles in his den. The room is \( 23 \frac{1}{2} \) feet long and 15 feet wide. Each ceiling tile covers \( 2 \frac{1}{2} \) square feet. What is the minimum number of ceiling tiles that he will need to cover the ceiling of his den?
   - A. 200
   - B. 146
   - C. 141
   - D. 152

6. Kathleen is buying 3 bags of cement to repair her driveway. Each bag weighs \( 25 \frac{1}{2} \) pounds. How many pounds of cement is she buying?
   - A. 78 \( \frac{1}{2} \)
   - B. 76 \( \frac{1}{2} \)
   - C. 75
   - D. 70 \( \frac{1}{2} \)

7. Thirty-five girls went out for the soccer team. Of these, \( \frac{5}{7} \) made the team. Of the girls who made the team, \( \frac{4}{5} \) showed up for practice on Wednesday. How many girls were at the Wednesday practice?
   - A. 20
   - B. 22
   - C. 25
   - D. 35
8. What is the perimeter of this triangle?
   
   \[(\text{Remember: Perimeter is the distance around a geometric figure.})\]

<table>
<thead>
<tr>
<th>Option</th>
<th>Perimeter in inches</th>
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<tr>
<td>A. (4 \frac{21}{64})</td>
<td></td>
</tr>
<tr>
<td>B. (5 \frac{11}{20})</td>
<td></td>
</tr>
<tr>
<td>C. (6 \frac{1}{4})</td>
<td></td>
</tr>
<tr>
<td>D. (6 \frac{1}{2})</td>
<td></td>
</tr>
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9. What is the diameter of the hole in this gasket?

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<td>A. 5 in.</td>
<td></td>
</tr>
<tr>
<td>B. (4 \frac{1}{2}) in.</td>
<td></td>
</tr>
<tr>
<td>C. (1 \frac{1}{2}) in.</td>
<td></td>
</tr>
<tr>
<td>D. 1 in.</td>
<td></td>
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10. Jerry is a developer and just bought 36 acres that he intends to partition into home lots. Each lot must be at least \(\frac{3}{4}\) of an acre. How many homes can he build on this parcel?

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<th>Option</th>
<th>Number of homes</th>
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<tr>
<td>A. 12</td>
<td></td>
</tr>
<tr>
<td>B. 9</td>
<td></td>
</tr>
<tr>
<td>C. 48</td>
<td></td>
</tr>
<tr>
<td>D. 27</td>
<td></td>
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A. These are multiple choice items. Solve the problem and circle the correct answer.

A solution is presented for each problem. Remember that there may be other approaches! Always use sound mathematical reasoning that you can apply in other situations.

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<td>The Longview Shores swimming pool is 2½ times as long as it is wide. There are 6 swimming lanes running the length of the pool. Each lane is 6 feet wide. What is the length of the pool?</td>
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<tr>
<td></td>
<td><img src="image1.jpg" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td><strong>Solution:</strong></td>
</tr>
<tr>
<td></td>
<td>The width of the pool is 6 feet × 6 lanes or 36 feet wide.</td>
</tr>
<tr>
<td></td>
<td>The pool is 2½ times as long as it is wide.</td>
</tr>
<tr>
<td></td>
<td>Mathematically stated:</td>
</tr>
<tr>
<td></td>
<td>$\frac{5}{2} \times 36 = \frac{180}{2} = 90$ feet</td>
</tr>
<tr>
<td></td>
<td>The correct answer is “D”</td>
</tr>
<tr>
<td>A.</td>
<td>30 ft.</td>
</tr>
<tr>
<td>B.</td>
<td>36 ft.</td>
</tr>
<tr>
<td>C.</td>
<td>51 ft.</td>
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<td><strong>90 ft.</strong></td>
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| 2.     | Miriam has a custard recipe that requires 1 cup of sugar, 6 eggs, 3 cups of milk, and 1 teaspoon of vanilla. But she has only 4 eggs. She decides to adjust the recipe to the 4 eggs. How much milk will she need? |
|        | ![Image](image2.jpg) |
|        | **Solution:** |
|        | Miriam has 4 of the 6 eggs the recipe calls for ... so she has $\frac{4}{6}$ of the eggs. So she will have to reduce each ingredient to $\frac{4}{6}$ of the stated amount. To determine the amount of milk, set up the equation: |
|        | $\frac{4}{6} = \frac{N}{3}$ where N is the amount of milk. |
|        | Solve for N by cross multiplying, then dividing: |
|        | $4 \times 3 = 6 \times N$ |
|        | $12 = 6 \times N$ |
|        | $2 = N$ |
|        | The correct answer is “A” ... she needs 2 cups of milk for the recipe. |
| A.     | **2 cups** |
| B.     | 3 cups |
| C.     | 1 cups |
| D.     | 4 cups |
3. In a school with 350 students, \( \frac{3}{7} \) of the students are boys. How many boys attend the school?

A. 110  
B. 125  
C. 140  
D. 150

Solution:
The word “of” means multiplication. The problem states that three-sevenths of the 350 students are boys. Mathematically stated:

\[
\frac{3}{7} \text{ of } 350 = \frac{3}{7} \times 350 = \frac{1050}{7} = 150
\]

The correct answer is “D”.

4. Beth walked \( \frac{3}{4} \) of a mile yesterday and 1 \( \frac{1}{2} \) miles today. How far did she walk in total?

A. 1 \( \frac{3}{4} \)  
B. 2 \( \frac{1}{4} \)  
C. 2 \( \frac{1}{2} \)  
D. 3 \( \frac{1}{4} \)

Solution:
To find the distance that Beth walked, add the two distances: \( \frac{3}{4} + 1 \frac{1}{2} \)

Mathematically stated:

\[
\frac{3}{4} + 1 \frac{1}{2} = \frac{3}{4} + \frac{3}{2} = \frac{3}{4} + \frac{6}{4} = \frac{9}{4} = 2 \frac{1}{4}
\]

Note that you have to convert some mixed fractions to improper fractions as well as convert fractions so that they have a common denominator.

There are other ways to complete the addition of these two fractions ... as long as you’re using sound mathematical reasoning, it doesn’t matter!

The correct answer is “B” ... Beth walked a total of 2 \( \frac{1}{4} \) miles.

5. Carlos is putting ceiling tiles in his den. The room is 23 \( \frac{1}{2} \) feet long and 15 feet wide. Each ceiling tile covers 2 \( \frac{1}{2} \) square feet. What is the minimum number of ceiling tiles that he will need to cover the ceiling of his den?

A. 200  
B. 146  
C. 141  
D. 152

Solution:
First find the area of the ceiling by multiplying the length times the width.

\[
23 \frac{1}{2} \times 15 = \frac{47}{2} \times 15 = \frac{705}{2} = 352 \frac{1}{2} \text{ square feet}
\]

Now divide the area of the ceiling by the size of the ceiling tiles.

\[
352 \frac{1}{2} \div 2 \frac{1}{2} = \frac{705}{2} \div \frac{5}{2} = \frac{705}{2} \times \frac{2}{5} = \frac{705}{5} = 141
\]

The correct answer is “C” ... Carlos needs 141 ceiling tiles.
6. Kathleen is buying 3 bags of cement to repair her driveway. Each bag weighs 25 \(\frac{1}{2}\) pounds. How many pounds of cement is she buying?

A. \(78\frac{1}{2}\)

B. \(76\frac{1}{2}\)

C. \(75\)

D. \(70\frac{1}{2}\)

**Solution:**

Multiply the number of bags times the weight of each bag.

\[25 \frac{1}{2} \times 3 = \frac{51}{2} \times 3 = \frac{153}{2} = 76\frac{1}{2}\] pounds

The correct answer is “B” ... Kathleen is buying 76\(\frac{1}{2}\) pounds of cement.

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7. Thirty-five girls went out for the soccer team. Of these, \(\frac{5}{7}\) made the team. Of the girls who made the team, \(\frac{4}{5}\) showed up for practice on Wednesday. How many girls were at the Wednesday practice?

A. 20

B. 22

C. 25

D. 35

**Solution:**

To determine the number of girls who were at practice, you must first know how many of the 35 girls made the team. To calculate that number:

\[\frac{5}{7} \text{ of } 35 = \frac{5}{7} \times 35 = \frac{175}{7} = 25 \text{ girls made the team}\]

Now, \(\frac{4}{5}\) of the girls who made the team came to the practice:

\[\frac{4}{5} \text{ of } 25 = \frac{4}{5} \times 25 = \frac{100}{5} = 20 \text{ of the girls came to the practice}\]

The correct answer is “A”

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8. What is the perimeter of this triangle?

(\text{Remember: Perimeter is the distance around a geometric figure.})

A. 4 \(\frac{21}{64}\)

B. 5 \(\frac{11}{20}\)

C. 6 \(\frac{1}{4}\)

D. 6 \(\frac{1}{2}\)

**Solution:**

To calculate the perimeter of the triangle, add the lengths of the sides.

\[1\frac{3}{8} + 2\frac{1}{4} + 2\frac{7}{8} = \frac{11}{8} + \frac{9}{4} + \frac{23}{8} = \frac{11}{8} + \frac{18}{8} + \frac{23}{8} = \frac{52}{8} = 6\frac{4}{8} \text{ or } 6\frac{1}{2} \text{ inches}\]

The correct answer is “D” ... the perimeter of the triangle is 6 \(\frac{1}{2}\) inches.
9. What is the diameter of the hole in this gasket?

A. 5 in.
B. 4 \(\frac{1}{2}\) in.
C. 1 \(\frac{1}{2}\) in.
D. 1 in.

**Solution:**

The hole in the gasket is 1 \(\frac{3}{4}\) inches from each side. Add these two lengths, then subtract the total from the entire length of the gasket which is 5 inches.

\[
1\frac{3}{4} + 1\frac{3}{4} = \frac{7}{4} + \frac{7}{4} = \frac{14}{4} = 3\frac{2}{4} \text{ or } 3\frac{1}{2}
\]

\[
5 - 3\frac{1}{2} = \frac{10}{2} - \frac{7}{2} = \frac{3}{2} = 1\frac{1}{2} \text{ inches}
\]

The correct answer is “C” ... the diameter is 1 \(\frac{1}{2}\) inches.

---

10. Jerry is a developer and just bought 36 acres that he intends to partition into home lots. Each lot must be at least \(\frac{3}{4}\) of an acre. How many homes can he build on this parcel?

A. 12
B. 9
C. 48
D. 27

**Solution:**

The question can be rephrased as: how many \(\frac{3}{4}\) acre lots are in 36 acres?

This question is answered by dividing 36 by \(\frac{3}{4}\):

\[
36 \div \frac{3}{4} = 36 \times \frac{4}{3} = \frac{144}{3} = 48
\]

The correct answer is “C” ... 48 lots.