1. Kim and Courtney share a 16-ounce box of cereal. By the end of the week, Kim has eaten \( \frac{3}{8} \) of the box, and Courtney has eaten \( \frac{2}{4} \) of the box of cereal. What fraction of the box is left?

\[
\frac{1}{4} \times \frac{2}{2} = \frac{2}{8} \quad \text{courtney}
\]

\[
1 - \frac{2}{8} = \frac{8}{8} - \frac{2}{8} = \frac{6}{8} = \frac{3}{4}
\]

\( \frac{3}{8} \) of the box is left.

2. Mathilde has 20 pints of green paint. She uses \( \frac{2}{5} \) of it to paint a landscape and \( \frac{2}{10} \) of it while painting a clover. She decides that, for her next painting, she will need 14 pints of green paint. How much more paint will she need to buy?

\[
\frac{2}{5} \times 2 = \frac{4}{10} \quad \text{landscape}
\]

10 units = 20 pints

1 unit = \( \frac{20}{10} = 2 \) pints

3 units left = \( 3 \times 2 = 6 \) pints left

\( 6 + 8 = 14 \)

\( 14 - 6 = 8 \) pints more
3. Jack, Jill, and Bill each carried a 48-ounce bucket full of water down the hill. By the time they reached the bottom, Jack’s bucket was only \( \frac{2}{4} \) full, Jill’s was \( \frac{2}{3} \) full, and Bill’s was \( \frac{1}{5} \) full. How much water did they spill altogether on their way down the hill?

Jack: \( \frac{4}{4} \times \frac{3}{4} = \frac{1}{4} \times 48 = \frac{48}{4} = 12 \text{ oz} \)

Jill: \( \frac{2}{3} \times \frac{2}{3} = \frac{1}{3} \times 48 = \frac{48}{3} = 16 \text{ oz} \)

Bill: \( \frac{4}{5} - \frac{1}{5} = \frac{5}{5} \times \frac{4}{5} = 24 \times \frac{5}{5} = 40 \text{ oz} \)

4. Mrs. Díaz makes 5 dozen cookies for her class. One-ninth of her 27 students are absent the day she brings the cookies. If she shares the cookies equally among the students who are present, how many cookies will each student get?

\[ \frac{1}{9} \text{ of } 27 = \frac{1}{9} \times 27 = \frac{27}{9} = 3 \text{ students absent} \quad 24 \text{ are present} \]

\[ \frac{12}{5} \times \frac{5}{24} = \frac{60}{120} = \frac{5}{2} = 2 \frac{1}{2} \text{ cookies per student} \]

Each student gets 2 \( \frac{1}{2} \) cookies

5. Create a story problem about a fish tank for the tape diagram below. Your story must include a fraction.

---

**Eureka Math**

Lesson 11: Solve and create fraction word problems involving addition, subtraction, and multiplication.
There are two ways to do #1

1. Jenny's mom says she has an hour before it's bedtime. Jenny spends 1/3 of the hour texting a friend and 1/4 of the time brushing her teeth and putting on her pajamas. She spends the rest of the time reading her book. How many minutes did Jenny read?

   \[
   \frac{1}{3} \text{ of } 60 = \frac{60}{3} = 20 \text{ minutes texting}
   \]

   \[
   \frac{1}{4} \text{ of } 60 = \frac{60}{4} = 15 \text{ minutes teeth and pajamas}
   \]

   \[20 + 15 = 35 \text{ minutes} \]

   \[60 - 35 = 25 \text{ minutes reading} \]

2. A-Plus Auto Body is painting designs on a customer's car. They had 18 pints of blue paint on hand. They used 1/2 of it for the flames and 1/3 of it for the sparks. They need 7 3/4 pints of blue paint to paint the next design. How many more pints of blue paint will they need to buy?

   \[
   \frac{1}{2} \text{ of } 18 = \frac{18}{2} = 9 \text{ pints}
   \]

   \[
   \frac{1}{3} \text{ of } 18 = \frac{18}{3} = 6 \text{ pints}
   \]

   \[9 + 6 = 15 \text{ pints used} \]

   \[7 \frac{3}{4} \text{ need} \]

   \[18 - 15 = 3 \text{ pints left} \]

   \[7 \frac{3}{4} \text{ will buy} \]

3. Giovanna, Frances, and their dad each carried a 10-pound bag of soil into the backyard. After putting soil in the first flower bed, Giovanna's bag was 5/6 full, Frances's bag was 2/5 full, and their dad's was 3/4 full. How many pounds of soil did they put in the first flower bed altogether?

   Giovanna \[\frac{5}{6} \times 10 = \frac{50}{6} = 8 \frac{2}{3} \]

   Frances \[\frac{2}{5} \times 10 = 4\]

   dad \[\frac{3}{4} \times 10 = \frac{30}{4} = 7 \frac{1}{2}\]

   \[8 \frac{2}{3} + 4 + 7 \frac{1}{2} = 17 \frac{3}{4} \text{ pounds} \]
4. Mr. Chan made 252 cookies for the Annual Fifth Grade Class Bake Sale. They sold \( \frac{2}{4} \) of them, and \( \frac{3}{9} \) of the remaining cookies were given to PTA members. Mr. Chan allowed the 12 student helpers to divide the cookies that were left equally. How many cookies will each student get?

\[
\frac{3}{4} \times \frac{252}{63} = 189 \text{ sold}
\]

\[
\frac{252}{189} = 139 \text{ left}
\]

\[
\frac{4}{2} = \frac{6}{12} = \frac{3}{6} \text{ cookies for each student}
\]

5. Using the tape diagram below, create a story problem about a farm. Your story must include a fraction.

---

EUREKA MATH

Lesson 11: Solve and create fraction word problems involving addition, subtraction, and multiplication.

engage\textsuperscript{ny}

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Lesson 12 Problem Set

1. A baseball team played 32 games and lost 8. Katy was the catcher in \( \frac{5}{6} \) of the winning games and \( \frac{3}{4} \) of the losing games.

   a. What fraction of the games did the team win?

   \[
   \frac{24}{32} = \frac{3}{4}
   \]

   They won \( \frac{3}{4} \) of the games they played.

   b. In how many games did Katy play catcher?

   \[
   \frac{\frac{5}{6}}{\frac{1}{1}} = 15 \text{ games - winning games}
   \]

   \[
   \frac{\frac{3}{4}}{\frac{1}{1}} = 7 \text{ games - losing games}
   \]

   Katy played 17 games.

2. In Mrs. Elliott's garden, \( \frac{1}{8} \) of the flowers are red, \( \frac{1}{4} \) of them are purple, and \( \frac{3}{8} \) of the remaining flowers are pink. If there are 128 flowers, how many flowers are pink?

   \[
   \frac{1}{8} + \frac{1}{4}
   \]

   \[
   \frac{1}{8} = \frac{1}{8} \text{ red}
   \]

   \[
   \frac{1}{4} \times \frac{2}{1} = \frac{2}{8} \text{ purple}
   \]

   \[
   \frac{3}{8} \text{ are red and purple}
   \]

   \[
   \frac{\frac{3}{8}}{\frac{1}{1}} = 48 \text{ flowers are red and purple}
   \]

   \[
   128 - 48 - \frac{80}{5} = 16 \text{ flowers are pink}
   \]

   80 remaining flowers.
3. Lillian and Darlene plan to get their homework finished within one hour. Darlene completes her math homework in \( \frac{3}{5} \) hour. Lillian completes her math homework with \( \frac{5}{6} \) hour remaining. Who completes her homework faster, and by how many minutes?

Bonus: Give the answer as a fraction of an hour.

\[
\text{Darlene: } \frac{3}{5} \times 60 \text{ min} = \frac{3}{5} \times 60 = 36 \text{ minutes}
\]

\[
\text{Lillian: } \frac{5}{6} - \frac{5}{6} = 10 \text{ minutes}
\]

\[
36 - 10 = 26 \text{ minutes faster}
\]

4. Create and solve a story problem about a baker and some flour whose solution is given by the expression \( \frac{1}{4} \times (3 + 5) \).
5. Create and solve a story problem about a baker and 36 kilograms of an ingredient that is modeled by the following tape diagram. Include at least one fraction in your story.

![Tape diagram](image)

6. Of the students in Mr. Smith's fifth-grade class, \( \frac{1}{3} \) were absent on Monday. Of the students in Mrs. Jacobs' class, \( \frac{2}{5} \) were absent on Monday. If there were 4 students absent in each class on Monday, how many students are in each class?

Mr. Smith

\[ \frac{1}{3} = 4 \text{ students} \]

1 unit = 4 students
3 units = 12 students
in Mr. Smith's class

Mrs. Jacobs

\[ \frac{2}{5} = 4 \text{ students} \]

2 units = 4 students
1 unit = 2 students
5 units x 2 students = 10 students in Mrs. Jacobs' class
1. Terrence finished a word search in \(\frac{3}{4}\) the time it took Frank. Charlotte finished the word search in \(\frac{2}{3}\) the time it took Terrence. Frank finished the word search in 32 minutes. How long did it take Charlotte to finish the word search?

\[
\text{Terrence} = \frac{3}{4} \text{ of Frank} = \frac{3}{4} \times 32 = 24 \text{ Terrence}
\]

\[
\text{Charlotte} = \frac{2}{3} \text{ of Terrence} = \frac{2}{3} \times 24 = 16 \text{ Charlotte}
\]

2. Ms. Phillips ordered 56 pizzas for a school fundraiser. Of the pizzas ordered, \(\frac{3}{4}\) of them were pepperoni, 19 were cheese, and the rest were veggie pizzas. What fraction of the pizzas was veggie?

\[
\frac{2}{7} \times \frac{3}{56} = 16 \text{ pepperoni}
\]

\[
+ 19 \text{ cheese}
\]

\[
35 \text{ pepperoni and cheese}
\]

\[
\frac{56}{21} \text{ veggie} = \frac{21}{56} = \frac{3}{8} \text{ veggie}
\]
3. In an auditorium, of the students are fifth graders, are fourth graders, and of the remaining students are second graders. If there are 96 students in the auditorium, how many second graders are there?

5th Graders \( \frac{1}{6} \times 96 = 16 \)

4th Graders \( \frac{1}{3} \times 96 = 32 \)

2nd \( \frac{1}{4} \times 48 = 12 \) students in 2nd grade

48 4th + 5th grade students

6 = 48 students not 4th or 5th grade

4. At a track meet, Jacob and Daniel compete in the 220 m hurdles. Daniel finishes in of a minute. Jacob finishes with of a minute remaining. Who ran the race in the faster time? 

Daniel ran in 45 sec with 15 sec left in the minute.

\( \frac{3}{4} \times 1 = 45 \) seconds,

\( \frac{5}{6} \times 1 = 25 \) seconds, Jacob had 25 seconds left in the minute. (60 - 25 = 35 seconds he ran it in)

Bonus: Express the difference in their times as a fraction of a minute.

Jacob ran the race in 35 seconds
Daniel ran the race in 25 seconds

The difference is 10 seconds

1 minute = 60 seconds

The difference in fraction of a minute is \( \frac{1}{6} \)
5. Create and solve a story problem about a runner who is training for a race. Include at least one fraction in your story.

![Diagram showing a 48 km distance with a fraction represented by a shaded part.]

6. Create and solve a story problem about two friends and their weekly allowance whose solution is given by the expression $\frac{1}{5} \times (12 + 8)$. 

![Diagram showing a 48 km distance with a fraction represented by a shaded part.]

Lesson 12: Solve and create fraction word problems involving addition, subtraction, and multiplication.
1. Solve. Draw a rectangular fraction model to show your thinking. Then, write a multiplication sentence. The first one has been done for you.

a. Half of $\frac{1}{2}$ pan of brownies = $\frac{1}{8}$ pan of brownies.

\[
\frac{1}{2} \times \frac{1}{2} = \frac{1}{4} = \frac{2}{8}
\]

b. Half of $\frac{1}{3}$ pan of brownies = $\frac{1}{6}$ pan of brownies.

c. A fourth of $\frac{1}{3}$ pan of brownies = $\frac{1}{12}$ pan of brownies.

\[
\frac{1}{4} \times \frac{1}{3} = \frac{1}{12}
\]

d. $\frac{1}{4}$ of $\frac{1}{4}$

\[
\frac{1}{4} \times \frac{1}{4} = \frac{1}{16}
\]

e. $\frac{1}{2}$ of $\frac{1}{6}$

\[
\frac{1}{2} \times \frac{1}{6} = \frac{1}{12}
\]
2. Draw rectangular fraction models of $3 \times \frac{1}{4}$ and $\frac{1}{3} \times \frac{1}{4}$. Compare multiplying a number by 3 and by 1 third.

\[
3 \times \frac{1}{4} = \frac{3}{4} \\
\frac{1}{3} \times \frac{1}{4} = \frac{1}{12} \\
\frac{3}{4} \times 3 = \frac{9}{12} \\
\frac{9}{12} > \frac{1}{12}
\]

3. $\frac{1}{2}$ of Ila’s workspace is covered in paper. $\frac{1}{3}$ of the paper is covered in yellow sticky notes. What fraction of Ila’s workspace is covered in yellow sticky notes? Draw a picture to support your answer.

\[
\frac{1}{3} \times \frac{1}{2} = \frac{1}{6} \\
\frac{1}{6} of Ila’s workspace is covered in sticky notes.
\]

4. A marching band is rehearsing in rectangular formation. $\frac{1}{5}$ of the marching band members play percussion instruments. $\frac{1}{2}$ of the percussionists play the snare drum. What fraction of all the band members play the snare drum?

\[
\frac{1}{2} \times \frac{1}{5} = \frac{1}{10} \\
\frac{1}{10} of all band members play the snare drum.
\]

5. Marie is designing a bedspread for her grandson’s new bedroom. $\frac{2}{3}$ of the bedspread is covered in race cars, and the rest is striped. $\frac{1}{4}$ of the stripes are red. What fraction of the bedspread is covered in red stripes?

\[
\frac{1}{2} of the bedspread is covered in red stripes.
\]
1. Solve. Draw a rectangular fraction model to show your thinking.

   a. Half of $\frac{1}{2}$ cake = \( \frac{1}{4} \) cake.

   b. One-third of $\frac{1}{2}$ cake = \( \frac{1}{6} \) cake.

   c. $\frac{1}{4}$ of $\frac{1}{2}$ = \( \frac{1}{8} \)

   d. $\frac{1}{2} \times \frac{1}{5}$ = \( \frac{1}{10} \)

   e. $\frac{1}{3} \times \frac{1}{3}$ = \( \frac{1}{9} \)

   f. $\frac{1}{4} \times \frac{1}{3}$ = \( \frac{1}{12} \)
2. Noah mows $\frac{1}{2}$ of his property and leaves the rest wild. He decides to use $\frac{1}{5}$ of the wild area for a vegetable garden. What fraction of the property is used for the garden? Draw a picture to support your answer.

![Diagram showing 1/10 of property is garden]

3. Fawn plants $\frac{2}{3}$ of the garden with vegetables. Her son plants the remainder of the garden. He decides to use $\frac{1}{2}$ of his space to plant flowers, and in the rest, he plants herbs. What fraction of the entire garden is planted in flowers? Draw a picture to support your answer.

![Diagram showing 1/6 of entire garden is flowers]

4. Diego eats $\frac{1}{5}$ of a loaf of bread each day. On Tuesday, Diego eats $\frac{1}{4}$ of the day’s portion before lunch. What fraction of the whole loaf does Diego eat before lunch on Tuesday? Draw a rectangular fraction model to support your thinking.

![Diagram showing 1/20 of loaf eaten before lunch on Tuesday]
### Lesson 14

#### Sprint

**Side A**

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1 Note: Answers are given here in unit form for ease of reading. Students may answer in standard form.
1. Solve. Draw a rectangular fraction model to explain your thinking. Then, write a number sentence. An example has been done for you.

Example:

\[ \frac{1}{2} \text{ of } \frac{2}{5} = \frac{1}{2} \times \frac{2}{5} = \frac{2}{10} = \frac{1}{5} \]

a. \( \frac{1}{3} \text{ of } \frac{3}{4} = \frac{1}{3} \times \frac{3}{4} = \frac{3}{12} = \frac{1}{4} \)

b. \( \frac{1}{2} \text{ of } \frac{4}{5} = \frac{1}{2} \times \frac{4}{5} = \frac{4}{10} = \frac{2}{5} \)

c. \( \frac{1}{3} \text{ of } \frac{2}{3} = \frac{1}{3} \times \frac{2}{3} = \frac{2}{9} = \frac{1}{2} \)

d. \( \frac{2}{3} \text{ of } \frac{1}{2} = \frac{2}{3} \times \frac{1}{2} = \frac{2}{6} = \frac{1}{3} \)

e. \( \frac{1}{2} \times \frac{3}{5} = \frac{3}{10} \)

f. \( \frac{2}{3} \times \frac{1}{4} = \frac{4}{12} = \frac{1}{3} \)
2. \( \frac{5}{8} \) of the songs on Harrison’s music player are hip-hop. \( \frac{1}{3} \) of the remaining songs are rhythm and blues. What fraction of all the songs are rhythm and blues? Use a tape diagram to solve.

\[ \frac{1}{3} \times \frac{3}{8} = \frac{3}{24} = \frac{1}{8} \text{ of songs are rhythm + blues} \]

3. Three-fifths of the students in a room are girls. One-third of the girls have blond hair. One-half of the boys have brown hair.
   a. What fraction of all the students are girls with blond hair? \( \frac{1}{3} \) of \( \frac{3}{5} \)

\[ \frac{1}{3} \times \frac{3}{5} = \frac{3}{15} = \frac{1}{5} \text{ of all students have blond hair} \]

b. What fraction of all the students are boys without brown hair?

\( \frac{1}{2} \) of \( \frac{2}{5} \)

\[ \frac{2}{10} = \frac{1}{5} \text{ of all students are boys without brown hair} \]

4. Cody and Sam mowed the yard on Saturday. Dad told Cody to mow \( \frac{1}{4} \) of the yard. He told Sam to mow \( \frac{1}{3} \) of the remainder of the yard. Dad paid each of the boys an equal amount. Sam said, “Dad, that’s not fair! I had to mow one-third, and Cody only mowed one-fourth!” Explain to Sam the error in his thinking.

Draw a picture to support your reasoning.

Sam mowed \( \frac{1}{3} \) of \( \frac{3}{4} \) which is \( \frac{1}{3} \times \frac{3}{4} = \frac{3}{12} = \frac{1}{4} \)

So Sam and Cody mowed the same.

It would have been unfair if Sam had mowed \( \frac{1}{3} \) of the whole yard.
1. Solve. Draw a rectangular fraction model to explain your thinking.

a. \( \frac{1}{2} \) of \( \frac{2}{3} \) is \( \frac{2}{2} \) of \( \frac{2}{3} \) third(s) = \( \frac{1}{3} \) third(s)

\[
\frac{1}{2} \times \frac{2}{3} = \frac{2}{6} = \frac{1}{3}
\]

b. \( \frac{1}{2} \) of \( \frac{4}{4} \) is \( \frac{1}{2} \) of \( \frac{4}{4} \) third(s) = \( \frac{2}{2} \) third(s)

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

c. \( \frac{1}{3} \) of \( \frac{3}{5} \) = \( \frac{1}{5} \)

\[
\frac{1}{3} \times \frac{3}{5} = \frac{3}{15} = \frac{1}{5}
\]

d. \( \frac{1}{2} \) of \( \frac{6}{8} \) = \( \frac{1}{2} \) of \( \frac{6}{8} \)

\[
\frac{1}{2} \times \frac{6}{8} = \frac{6}{16} = \frac{3}{8}
\]

e. \( \frac{3}{5} \)

\[
\frac{3}{5} \times \frac{4}{5} = \frac{4}{15}
\]

f. \( \frac{4}{8} \) of \( \frac{1}{3} \)

\[
\frac{4}{8} \times \frac{1}{3} = \frac{4}{15}
\]

2. Sarah has a photography blog. \( \frac{3}{7} \) of her photos are of nature. \( \frac{1}{4} \) of the rest are of her friends. What fraction of all of Sarah’s photos is of her friends? Support your answer with a model.

\[
\frac{1}{7} \text{ of all photos are friends}
\]
3. At Laurita’s Bakery, \(\frac{3}{5}\) of the baked goods are pies, and the rest are cakes. \(\frac{1}{3}\) of the pies are coconut. \(\frac{1}{6}\) of the cakes are angel food.
   
a. What fraction of all of the baked goods at Laurita’s Bakery are coconut pies?
   \[
   \frac{1}{5} \text{ of baked goods are coconut pies.}
   \]
   
b. What fraction of all of the baked goods at Laurita’s Bakery are angel food cakes?
   \[
   \frac{1}{6} \text{ of } \frac{3}{5} = \frac{2}{30} = \frac{1}{15}
   \]
   \[
   \frac{1}{15} \text{ of all goods are angel food}
   \]

4. Grandpa Mick opened a pint of ice cream. He gave his youngest grandchild \(\frac{1}{5}\) of the ice cream and his middle grandchild \(\frac{1}{4}\) of the remaining ice cream. Then, he gave his oldest grandchild \(\frac{1}{3}\) of the ice cream that was left after serving the others.
   
a. Who got the most ice cream? How do you know? Draw a picture to support your reasoning.
   \[
   \text{All three children received } \frac{1}{5} \text{ of a pint}
   \]
   
b. What fraction of the pint of ice cream will be left if Grandpa Mick serves himself the same amount as the second grandchild?
   \[
   \frac{1}{5} \text{ of a pint of ice cream will be left.}
   \]
1. Solve. Draw a rectangular fraction model to explain your thinking. Then, write a multiplication sentence. The first one is done for you.

a. \( \frac{2}{5} \) of \( \frac{3}{5} \)

\[
\frac{2}{5} \times \frac{3}{5} = \frac{6}{25} = \frac{2}{5}
\]

b. \( \frac{3}{4} \) of \( \frac{2}{5} \)

\[
\frac{3}{4} \times \frac{2}{5} = \frac{6}{20} = \frac{3}{10}
\]

c. \( \frac{2}{5} \) of \( \frac{2}{3} \)

\[
\frac{2}{5} \times \frac{2}{3} = \frac{4}{15}
\]

d. \( \frac{4}{5} \times \frac{2}{3} = \frac{8}{15} \)

e. \( \frac{3}{4} \times \frac{2}{3} = \frac{1}{2} \)

2. Multiply. Draw a rectangular fraction model if it helps you, or use the method in the example.

Example: \( \frac{5}{7} \times \frac{3}{9} = \frac{3 \times 5}{7 \times 9} = \frac{15}{63} = \frac{5}{21} \)

a. \( \frac{3}{4} \times \frac{5}{6} \)

\[
\frac{3}{4} \times \frac{5}{6} = \frac{5}{8}
\]

b. \( \frac{4}{5} \times \frac{3}{8} \)

\[
\frac{4}{5} \times \frac{3}{8} = \frac{4}{8} = \frac{1}{2}
\]
3. Phillip's family traveled \( \frac{3}{10} \) of the distance to his grandmother's house on Saturday. They traveled \( \frac{2}{7} \) of the remaining distance on Sunday. What fraction of the total distance to his grandmother's house was traveled on Sunday?

\[ \frac{3}{10} \text{ of total distance was traveled on Sunday} \]

4. Santino bought a \( \frac{2}{3} \) pound bag of chocolate chips. He used \( \frac{2}{3} \) of the bag while baking. How many pounds of chocolate chips did he use while baking?

\[ \frac{2}{3} \text{ of } \frac{3}{4} \]

\[ \frac{2}{3} \times \frac{3}{4} = \frac{2}{4} = \frac{1}{2} \]

5. Farmer Dave harvested his corn. He stored \( \frac{5}{9} \) of his corn in one large silo and \( \frac{2}{3} \) of the remaining corn in a small silo. The rest was taken to market to be sold.

a. What fraction of the corn was stored in the small silo?

\[ \frac{3}{9} = \frac{1}{3} \text{ of corn stored in small silo} \]

b. If he harvested 18 tons of corn, how many tons did he take to market?

\[ \frac{1}{9} \text{ of } 18 \text{ tons} = \frac{1}{9} \times 18 = 2 \text{ tons of corn went to market} \]
Name ___________________________________________ Date __________________

1. Solve. Draw a rectangular fraction model to explain your thinking. Then, write a multiplication sentence.
   a. \( \frac{2}{3} \) of \( \frac{2}{5} = \)
      \[ \frac{2}{3} \times \frac{2}{5} = \frac{4}{15} \]
   b. \( \frac{7}{8} \) of \( \frac{3}{4} = \)
      \[ \frac{7}{8} \times \frac{3}{4} = \frac{21}{32} \]
   c. \( \frac{2}{5} \) of \( \frac{4}{5} = \)
      \[ \frac{2}{5} \times \frac{4}{5} = \frac{8}{25} \]
   d. \( \frac{4}{5} \) of \( \frac{3}{4} = \)
      \[ \frac{4}{5} \times \frac{3}{4} = \frac{3}{5} \]

2. Multiply. Draw a rectangular fraction model if it helps you.
   a. \( \frac{5}{6} \times \frac{3}{10} = \frac{1}{2} \)
      \[ \frac{5}{6} \times \frac{3}{10} = \frac{1}{2} \]
   b. \( \frac{3}{4} \times \frac{4}{5} = \frac{3}{5} \)
      \[ \frac{3}{4} \times \frac{4}{5} = \frac{3}{5} \]
   c. \( \frac{5}{6} \times \frac{5}{8} = \frac{25}{48} \)
      \[ \frac{5}{6} \times \frac{5}{8} = \frac{25}{48} \]
   d. \( \frac{3}{4} \times \frac{5}{12} = \frac{5}{16} \)
      \[ \frac{3}{4} \times \frac{5}{12} = \frac{5}{16} \]
   e. \( \frac{8}{9} \times \frac{2}{3} = \frac{16}{27} \)
      \[ \frac{8}{9} \times \frac{2}{3} = \frac{16}{27} \]
   f. \( \frac{3}{7} \times \frac{2}{9} = \frac{6}{63} = \frac{2}{21} \)
      \[ \frac{3}{7} \times \frac{2}{9} = \frac{6}{63} = \frac{2}{21} \]
3. Every morning, Halle goes to school with a 1-liter bottle of water. She drinks $\frac{1}{4}$ of the bottle before school starts and $\frac{2}{3}$ of the rest before lunch.

a. What fraction of the bottle does Halle drink after school starts but before lunch?

$$\frac{2}{3}$$ or $\frac{1}{2}$

before Lunch

b. How many milliliters are left in the bottle at lunch?

$$\frac{1}{4} \text{ of } 1000 = \frac{1000}{4} = 250 \text{ mL}$$

4. Moussa delivered $\frac{3}{8}$ of the newspapers on his route in the first hour and $\frac{4}{5}$ of the rest in the second hour. What fraction of the newspapers did Moussa deliver in the second hour?

$$\frac{4}{8} = \frac{1}{2}$$

1st hour 2nd hour

5. Rose bought some spinach. She used $\frac{3}{5}$ of the spinach on a pan of spinach pie for a party and $\frac{3}{4}$ of the remaining spinach for a pan for her family. She used the rest of the spinach to make a salad.

a. What fraction of the spinach did she use to make the salad?

$$\frac{3}{5} \text{ of the family}$$

$$\frac{1}{10} \text{ of spinach to make salad}$$

b. If Rose used 3 pounds of spinach to make the pan of spinach pie for the party, how many pounds of spinach did Rose use to make the salad?

$$\frac{1}{2} \text{ lb}$$
Name ___________________________ Date ____________________

Solve and show your thinking with a tape diagram.

1. Mrs. Onusko made 60 cookies for a bake sale. She sold \( \frac{2}{3} \) of them and gave \( \frac{3}{4} \) of the remaining cookies to the students working at the sale. How many cookies did she have left?

\[
\begin{align*}
3 \text{ units} &= 60 \text{ cookies} \\
1 \text{ unit} &= 20 \text{ cookies} \\
20 \div 4 &= 5 \text{ cookies} \\
\text{Mrs. Onusko had 5 cookies left.}
\end{align*}
\]

2. Joakim is icing 30 cupcakes. He spreads mint icing on \( \frac{1}{5} \) of the cupcakes and chocolate on \( \frac{1}{2} \) of the remaining cupcakes. The rest will get vanilla icing. How many cupcakes have vanilla icing?

\[
\begin{align*}
5 \text{ units} &= 30 \text{ cupcakes} \\
1 \text{ unit} &= 6 \text{ cupcakes} \\
2 \text{ units are vanilla, so } 6 \times 2 &= 12 \text{ cupcakes have vanilla icing.}
\end{align*}
\]

3. The Booster Club sells 240 cheeseburgers. \( \frac{1}{4} \) of the cheeseburgers had pickles, \( \frac{1}{2} \) of the remaining burgers had onions, and the rest had tomato. How many cheeseburgers had tomato?

\[
\begin{align*}
4 \text{ units} &= 240 \text{ cheeseburgers} \\
1 \text{ unit} &= 60 \text{ cheeseburgers} \\
3 \text{ units} &= 180 \text{ cheeseburgers} \\
180 \div 2 &= 90 \text{ cheeseburgers had tomato.}
\end{align*}
\]
4. DeSean is sorting his rock collection. $\frac{2}{3}$ of the rocks are metamorphic, and $\frac{1}{2}$ of the remainder are igneous rocks. If the 3 rocks left over are sedimentary, how many rocks does DeSean have?

![Diagram]

1 unit = 12 rocks
3 units = 36 rocks

metamorphic igneous

5. Milan puts $\frac{3}{4}$ of her lawn-mowing money in savings and uses $\frac{1}{4}$ of the remaining money to pay back her sister. If she has $15 left, how much did she have at first?

![Diagram]

Savings: 3 units = $30
Sister: 1 unit = $10
4 units = $40

Milan had $40 at first

6. Parks is wearing several rubber bracelets. $\frac{1}{3}$ of the bracelets are tie-dye, $\frac{1}{6}$ are blue, and $\frac{1}{3}$ of the remainder are camouflage. If Parks wears 2 camouflage bracelets, how many bracelets does he have on?

![Diagram]

3 units = 6 bracelets
1 unit = 2 bracelets
6 units = 12 bracelets

7. Ahmed spent $\frac{1}{2}$ of his money on a burrito and a water bottle. The burrito cost 2 times as much as the water. The burrito cost $4. How much money does Ahmed have left?

![Diagram]

$4 \times 2 = 8$

2 units = $4$ so 1 unit = $2$

$x \times 2 = 8$
Solve and show your thinking with a tape diagram.

1. Anthony bought an 8-foot board. He cut off \( \frac{2}{4} \) of the board to build a shelf and gave \( \frac{1}{3} \) of the rest to his brother for an art project. How many inches long was the piece Anthony gave to his brother?

   \[ \frac{4}{3} \text{ units} = 8', \\
   \text{1 unit} = 2', \\
   2' = 24". \]

   \[
   \frac{1}{3} \text{ of } 24" = \\
   \frac{1}{3} \times 24" = 8".
   \]

   Anthony gave his brother an 8" piece.

2. Riverside Elementary School is holding a school-wide election to choose a school color. Five-eighths of the votes were for blue, \( \frac{5}{8} \) of the remaining votes were for green, and the remaining 48 votes were for red.

   a. How many votes were for blue?

   \[ \text{red = } \frac{4}{3} \text{ units} = 48, \\
   \text{1 unit} = 12. \]

   \[
   12 \times 3 = 36 \text{ in each } \frac{1}{8} \text{ section}, \\
   5 \text{ sections of } 36 = 180 \text{ votes were blue.}
   \]

   b. How many votes were for green?

   \[
   5 \text{ sections are green,} \\
   1 \text{ section is } 12, \\
   5 \times 12 = 60, \\
   60 \text{ votes were green.}
   \]
c. If every student got one vote, but there were 25 students absent on the day of the vote, how many students are there at Riverside Elementary School?

\[
\begin{align*}
\text{red votes} &= 48 \\
\text{green votes} &= 60 \\
\text{blue votes} &= 180
\end{align*}
\]

\[
\begin{align*}
48 \quad 60 \\
\frac{180}{288 \text{ students voted}} \\
+\frac{25 \text{ students absent}}{313 \text{ total students at Riverside Elementary}}
\end{align*}
\]

d. Seven-tenths of the votes for blue were made by girls. Did girls who voted for blue make up more than or less than half of all votes? Support your reasoning with a picture.

\[
\begin{align*}
\frac{7}{10} \text{ of } 180 &= \frac{7}{10} \times 180 = 126 \\
\text{girls who voted for blue}
\end{align*}
\]

\[
\begin{align*}
\frac{7}{10} \times 180 &= 126 \\
\frac{1}{2} \times 288 &= 144
\end{align*}
\]

The girls who voted for blue are less than \(\frac{1}{2}\) of all votes.

e. How many girls voted for blue?

126 girls voted for blue
1. Multiply and model. Rewrite each expression as a multiplication sentence with decimal factors. The first one is done for you.

a. $\frac{1}{10} \times \frac{1}{10} = \frac{1}{100}$

b. $\frac{4}{10} \times \frac{3}{10} = \frac{12}{100}$

$\frac{4}{10} \times 0.3 = 0.12$

$\frac{3}{10} \times \frac{4}{10} = 0.12$

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</tr>
<tr>
<td>0.2</td>
<td>$\frac{2}{10}$</td>
</tr>
</tbody>
</table>
2. Multiply. The first few are started for you.

   a. \[5 \times 0.7 = \frac{35}{10} = 3.5\]
   b. \[0.5 \times 0.7 = \frac{35}{100} = 0.35\]
   c. \[0.05 \times 0.7 = \frac{0.35}{100} = 0.0035\]
   d. \[6 \times 0.3 = \frac{18}{10} = 1.8\]
   e. \[0.6 \times 0.3 = \frac{18}{100} = 0.18\]
   f. \[0.06 \times 0.3 = \frac{0.18}{100} = 0.0018\]
   g. \[1.2 \times 4 = \frac{48}{10} = 4.8\]
   h. \[1.2 \times 0.4 = \frac{4.8}{100} = 0.048\]
   i. \[0.12 \times 0.4 = \frac{0.48}{1000} = 0.00048\]

3. A Boy Scout has a length of rope measuring 0.7 meter. He uses 2 tenths of the rope to tie a knot at one end. How many meters of rope are in the knot?

   \[2 \text{ tenths of } 0.7 = \frac{2}{10} \times 0.7 = \frac{14}{100} = 0.14 \text{ meter of rope are in the knot.}\]

4. After just 4 tenths of a 2.5-mile race was completed, Lenox took the lead and remained there until the end of the race.

   a. How many miles did Lenox lead the race?

   4 tenths of 2.5 miles
   \[\frac{4}{10} \times \frac{2.5}{10} = \frac{10}{100} = 0.1 \text{ mile he took the lead}\]

   b. Reid, the second-place finisher, developed a cramp with 3 tenths of the race remaining. How many miles did Reid run without a cramp?

   3 tenths of 2.5 miles
   \[\frac{3}{10} \times \frac{2.5}{10} = \frac{7.5}{100} = 0.75 \text{ miles without a cramp}\]
1. Multiply and model. Rewrite each expression as a number sentence with decimal factors. The first one is done for you.

a. \( \frac{1}{10} \times \frac{1}{10} \)
   
   \[= \frac{1 \times 1}{10 \times 10} = \frac{1}{100} \]
   
   \[0.1 \times 0.1 = 0.01\]

b. \( \frac{6}{10} \times \frac{2}{10} \)
   
   \[= \frac{6 \times 2}{10 \times 10} = \frac{12}{100} = 0.12 \]
   
   \[\frac{6}{10} \times \frac{2}{10} = \frac{12}{100} = 0.12\]

c. \( \frac{1}{10} \times 1.6 \)
   
   \[\frac{1}{10} \times \frac{16}{10} = \frac{1 \times 16}{10 \times 10} = \frac{16}{100}\]
   
   \[0.1 \times 1.6 = 0.16\]

d. \( \frac{5}{10} \times 1.9 \)
   
   \[\frac{5}{10} \times \frac{19}{10} = \frac{5 \times 19}{10 \times 10} = \frac{95}{100} = 0.95\]
   
   \[0.5 \times 1.9 = 0.95\]
2. Multiply. The first few are started for you.

a. \(4 \times 0.6 = \frac{24}{10}\)  
\[= 4 \times \frac{6}{10}\] 
\[= \frac{24}{10} = 2.4\]

b. \(0.4 \times 0.5 = \frac{24}{100}\)  
\[= \frac{4}{10} \times \frac{5}{10}\] 
\[= \frac{24}{100} = 0.24\]

c. \(0.04 \times 0.5 = \frac{0.24}{100}\)  
\[= \frac{4}{100} \times \frac{5}{10}\] 
\[= \frac{24}{1000} = 0.024\]

d. \(7 \times 0.3 = \frac{21}{10}\)  
\[= 7 \times \frac{3}{10}\] 
\[= \frac{21}{10} = 2.1\]

e. \(0.7 \times 0.3 = \frac{21}{100}\)  
\[= \frac{7}{10} \times \frac{3}{10}\] 
\[= \frac{21}{100} = 0.21\]

f. \(0.07 \times 0.3 = \frac{0.21}{10}\)  
\[= \frac{7}{100} \times \frac{3}{10}\] 
\[= \frac{21}{1000} = 0.021\]

g. \(1.3 \times 5 = \frac{65}{10}\)  
\[= \frac{13}{10} \times 5\] 
\[= \frac{65}{10} = 6.5\]

h. \(1.3 \times 0.5 = \frac{65}{100}\)  
\[= \frac{13}{10} \times \frac{5}{10}\] 
\[= \frac{65}{100} = 0.65\]

i. \(0.13 \times 0.5 = \frac{0.65}{10}\)  
\[= \frac{13}{100} \times \frac{5}{10}\] 
\[= \frac{65}{1000} = 0.065\]

3. Jennifer makes 1.7 liters of lemonade. If she pours 3 tenths of the lemonade in the glass, how many liters of lemonade are in the glass?

\[\frac{3}{10} \times 1.7 = \frac{5.1}{10}\]  
\[= \frac{51}{100} = 0.51\] liters are in the glass

4. Cassius walked 6 tenths of a 3.6-mile trail.

a. How many miles did Cassius have left to hike?  
\[\frac{6}{10} \times 3.6 = \frac{21.6}{10} = 2.16\] miles hiked  
\[\frac{1.44}{10} = 0.144\] mile left to hike

b. Cameron was 1.3 miles ahead of Cassius. How many miles did Cameron hike already?

Cassius hiked 2.16 mi
\[+ 1.30\text{ mi}\]

Cameron hiked 3.46 miles
Lesson 18

Sprint

Side A¹
1. 1 fourth
2. 1 sixth
3. 1 eighth
4. 1 fourteenth
5. 1 fourteenth
6. 1 sixth
7. 1 ninth
8. 1 eighth
9. 1 fifteenth
10. 1 fifteenth
11. 2 fifteenths
12. 4 fifteenths
13. 1 twelfth
14. 2 twelfths
15. 6 twelfths
16. 1 eighteenth
17. 5 eighteenths
18. 10 eighteenths
19. 10 twelfths
20. 1 twenty-fifth
21. 4 twenty-fifths
22. 6 twenty-fifths
23. 10 fifteenths
24. 15 tenths
25. 1 ninth
26. 2 ninths
27. 4 ninths
28. 6 sixths
29. 8 ninths
30. 10 ninths
31. 9 tenths
32. 3 twentieths
33. 12 twentieths
34. 15 twentieths
35. 18 twentieths
36. 6 twentieths
37. 1 forty-ninth
38. 3 fourtieths
39. 5 twenty-fourths
40. 9 sixteenths
41. 12 eighteenths
42. 18 eighths
43. 49 seventy-seCONDS
44. 63 ninety-sixths

Side B²
1. 1 sixth
2. 1 eighth
3. 1 tenth
4. 1 eighteenth
5. 1 eighteenth
6. 1 tenth
7. 1 fifteenth
8. 1 thirty-fifth
9. 1 fifteenth
10. 1 fifteenth
11. 2 fifteenths
12. 4 fifteenths
13. 1 twelfth
14. 3 twelfths
15. 6 twelfths
16. 1 eighteenth
17. 2 eighteenths
18. 10 eighteenths
19. 9 eighths
20. 1 twenty-fifth
21. 9 twenty-fifths
22. 12 twenty-fifths
23. 15 twentieths
24. 20 tenths
25. 1 sixteenth
26. 3 sixteenths
27. 9 sixteenths
28. 12 twelfths
29. 15 sixteenths
30. 18 sixteenths
31. 16 eighteenths
32. 2 fifteenths
33. 8 fifteenths
34. 10 fifteenths
35. 12 fifteenths
36. 6 fifteenths
37. 1 eighty-first
38. 3 fourtieths
39. 3 twenty-fourths
40. 4 ninths
41. 24 thirty-seconds
42. 12 ninths
43. 48 sixty-thirds
44. 56 eighty-fourths

¹Note: Answers written in unit form for ease of reading, but students may express answers in standard form.
1. Multiply using both fraction form and unit form. Check your answer by counting the decimal places. The first one is done for you.

   a. $\frac{2.3 \times 1.8}{10 \times 10} = \frac{23}{10} \times \frac{18}{10} = \frac{23 \times 18}{10 \times 10} = \frac{414}{100} = 4.14$

   b. $\frac{2.3 \times 0.9}{10 \times 10} = \frac{23}{10} \times \frac{9}{10} = \frac{23 \times 9}{100} = 2.07$

   c. $\frac{6.6 \times 2.8}{10 \times 10} = \frac{66}{10} \times \frac{28}{10} = \frac{66 \times 28}{100} = \frac{1848}{100} = 18.48$

2. Multiply using fraction form and unit form. Check your answer by counting the decimal places. The first one is done for you.

   a. $\frac{2.38 \times 1.8}{10 \times 10} = \frac{238}{100} \times \frac{18}{10} = \frac{238 \times 18}{100 \times 10} = \frac{4284}{1000} = 4.284$

   b. $\frac{2.37 \times 0.9}{10 \times 10} = \frac{237}{100} \times \frac{9}{10} = \frac{237 \times 9}{1000} = 21.33$

   c. $\frac{6.06 \times 2.8}{10 \times 10} = \frac{606}{100} \times \frac{28}{10} = \frac{606 \times 28}{100 \times 10} = \frac{16968}{1000} = 16.968$

EUREKA MATH
3. Solve using the standard algorithm. Show your thinking about the units of your product. The first one is done for you.
   a. \(3.2 \times 0.6 = 1.92\)
   b. \(3.2 \times 1.2 = 3.84\)

\[
\begin{array}{c}
3 \text{ tenths} \\
\times 6 \text{ tenths} \\
\hline
19.2 \text{ hundredths}
\end{array}
\]

\[
\begin{array}{c}
32 \times 6 = 192 \\
\hline
10 \times 10 = 100
\end{array}
\]

\[
\begin{array}{c}
3 \text{ tenths} \\
\times 12 \text{ tenths} \\
\hline
384 \text{ hundredths}
\end{array}
\]

\[
\begin{array}{c}
32 \times 12 \\
\hline
10 \times 10
\end{array}
\]

\[
\begin{array}{c}
64 + 3.20 \\
\hline
38.4 \text{ hundredths}
\end{array}
\]

\[
\begin{array}{c}
831 \text{ hundredths} \\
\times 24 \text{ tenths} \\
\hline
19,944 \text{ thousandths}
\end{array}
\]

\[
\begin{array}{c}
831 \times 24 = 19,944 \\
\hline
100 \times 10
\end{array}
\]

\[
\begin{array}{c}
831 \times 24 \\
\hline
1000
\end{array}
\]

\[
\begin{array}{c}
620 \\
\hline
9,944 \text{ thousandths}
\end{array}
\]

\[
\begin{array}{c}
620 \times 9,944 = 6,250,000 \\
\hline
1000
\end{array}
\]

\[
\begin{array}{c}
750 \times 35 = 26,250 \\
\hline
100 \times 10
\end{array}
\]

\[
\begin{array}{c}
750 \times 35 \\
\hline
1000
\end{array}
\]

\[
\begin{array}{c}
+23,500 \\
\hline
26,250 \text{ thousandths}
\end{array}
\]

4. Carolyn buys 1.2 pounds of chicken breast. If each pound of chicken breast costs $3.70, how much will she pay for the chicken breast?

\[
\begin{array}{c}
3.70 \times 1.2 = \text{370 hundredths} \\
\times 1.2 \\
\hline
44.40 \text{ thousandths}
\end{array}
\]

She will pay $4.40 for the chicken breast.

5. A kitchen measures 3.75 meters by 4.2 meters.
   a. Find the area of the kitchen. Area = Length \times Width

\[
\begin{array}{c}
3.75 \times 4.2 \\
\hline
15.750 \text{ square meters}
\end{array}
\]

b. The area of the living room is one and a half times that of the kitchen. Find the total area of the living room and the kitchen.

\[
\begin{array}{c}
1.5 \times 15.75 \text{ hundredths} \\
\times 18 \text{ tenths} \\
\hline
23.625 \text{ thousandths}
\end{array}
\]

23,625 livingroom 

\[
\begin{array}{c}
15.750 \text{ hundredths} \\
\times 18 \text{ tenths} \\
\hline
283.500 \text{ thousandths}
\end{array}
\]

283,500 kitchen

\[
\begin{array}{c}
+15,750 \text{ thousandths} \\
\hline
39,375 \text{ total}
\end{array}
\]

area = 39,375 m²
1. Multiply using fraction form and unit form. Check your answer by counting the decimal places. The first one is done for you.

a. \(3.3 \times 1.6 = \frac{33}{10} \times \frac{16}{10}\)
   \[3 \text{ 3 tenths} \times 1 \text{ 6 tenths} = \frac{33 \times 16}{100} + \frac{33 \times 8}{100}\]
   \[= \frac{528}{100} = 5.28\]

b. \(3.3 \times 0.8 = \frac{33}{10} \times \frac{8}{10}\)
   \[3 \text{ 3 tenths} \times 8 \text{ tenths} = \frac{33 \times 8}{100} = \frac{264}{100} = 2.64\]

c. \(4.4 \times 3.2 = \frac{44}{10} \times \frac{32}{10}\)
   \[44 \text{ 4 tenths} \times 32 \text{ tenths} = \frac{44 \times 32}{100} + \frac{13 \times 2 \times 0}{100}\]
   \[= \frac{1408}{100} = 14.08\]

d. \(2.2 \times 1.6 = \frac{22}{10} \times \frac{16}{10}\)
   \[22 \text{ 2 tenths} \times 1 \text{ 6 tenths} = \frac{22 \times 16}{100} + \frac{22 \times 2}{100}\]
   \[= \frac{352}{100} = 3.52\]

2. Multiply using fraction form and unit form. The first one is partially done for you.

a. \(3.36 \times 1.4 = \frac{336}{100} \times \frac{14}{10}\)
   \[3 \text{ 3.6 hundredths} \times 1 \text{ 4 tenths} = \frac{336 \times 14}{1000} + \frac{33.6 \times 0}{1000}\]
   \[= \frac{4704}{1000} = 4.704\]

b. \(3.35 \times 0.7 = \frac{335}{100} \times \frac{7}{10}\)
   \[3 \text{ 3.5 hundredths} \times 7 \text{ tenths} = \frac{335 \times 7}{1000} = \frac{2345}{1000} = 2.345\]

c. \(4.04 \times 3.2 = \frac{404}{100} \times \frac{32}{10}\)
   \[4 \text{ 0.4 hundredths} \times 3 \text{ 2 tenths} = \frac{404 \times 32}{1000} + \frac{121 \times 0}{1000}\]
   \[= \frac{12928}{1000} = 12.928\]

d. \(4.4 \times 0.16 = \frac{44}{10} \times \frac{16}{10}\)
   \[4 \text{ 4 hundredths} \times 1 \text{ 6 tenths} = \frac{44 \times 16}{1000} + \frac{44 \times 0}{1000}\]
   \[= \frac{704}{1000} = .704\]
3. Solve using the standard algorithm. Show your thinking about the units of your product. The first one is done for you.

a. $3.2 \times 0.6 = 1.92$

\[
\begin{array}{c}
3 \\
\times 6
\end{array}
\begin{array}{c}
tenths \\
\times \text{tenths}
\end{array}
\begin{array}{c}
1 \\
9 \\
2\text{ hundredths}
\end{array}
\]

b. $2.3 \times 2.1 = 4.83$

\[
\begin{array}{c}
2 \\
\times 2 \text{ tenths}
\end{array}
\begin{array}{c}
3 \\
\times \text{tenths}
\end{array}
\begin{array}{c}
10 \\
\times 10
\end{array}
\begin{array}{c}
= 23 \times 21
\end{array}
\]

\[
\begin{array}{c}
+ 4 \text{ hundredths}
\end{array}
\begin{array}{c}
100
\end{array}
\begin{array}{c}
= 483 \text{ hundredths}
\end{array}
\]

\[
\begin{array}{c}
7 \text{ hundredths}
\end{array}
\begin{array}{c}
3 \text{ tenths}
\end{array}
\begin{array}{c}
10 \times 10
\end{array}
\begin{array}{c}
= 74 \times 34
\end{array}
\]

\[
\begin{array}{c}
2 \text{ hundredths}
\end{array}
\begin{array}{c}
3 \text{ hundredths}
\end{array}
\begin{array}{c}
10 \times 10
\end{array}
\begin{array}{c}
= 741 \times 34
\end{array}
\]

\[
\begin{array}{c}
= 35194
\end{array}
\begin{array}{c}
\text{thousandths}
\end{array}
\begin{array}{c}
= 8000
\end{array}
\]

\[
\begin{array}{c}
7 \text{ hundredths}
\end{array}
\begin{array}{c}
6 \text{ tenths}
\end{array}
\begin{array}{c}
10 \times 10
\end{array}
\begin{array}{c}
= 770 \times 25
\end{array}
\]

\[
\begin{array}{c}
13 \text{ hundredths}
\end{array}
\begin{array}{c}
5 \text{ tenths}
\end{array}
\begin{array}{c}
10 \times 10
\end{array}
\begin{array}{c}
= 770 \times 25
\end{array}
\]

\[
\begin{array}{c}
+ 15400
\end{array}
\begin{array}{c}
\text{thousandths}
\end{array}
\begin{array}{c}
= 19250
\end{array}
\begin{array}{c}
= 19.250
\end{array}
\]

4. Erik buys 2.5 pounds of cashews. If each pound of cashews costs $7.70, how much will he pay for the cashews?

\[
\begin{array}{c}
770 \text{ hundredths}
\end{array}
\begin{array}{c}
2.5 \text{ tenths}
\end{array}
\begin{array}{c}
= 770 \times 25
\end{array}
\]

\[
\begin{array}{c}
192 \text{ hundredths}
\end{array}
\begin{array}{c}
50 \text{ tenths}
\end{array}
\begin{array}{c}
= 192 \times 25
\end{array}
\]

\[
\begin{array}{c}
= 19250
\end{array}
\begin{array}{c}
\text{thousandths}
\end{array}
\begin{array}{c}
= 19.250
\end{array}
\]

5. A swimming pool at a park measures 9.75 meters by 7.2 meters.

a. Find the area of the swimming pool.

\[
\begin{array}{c}
5915 \text{ hundredths}
\end{array}
\begin{array}{c}
78 \text{ tenths}
\end{array}
\begin{array}{c}
= 5915 \times 78
\end{array}
\]

\[
\begin{array}{c}
+ 68250
\end{array}
\begin{array}{c}
\text{thousandths}
\end{array}
\begin{array}{c}
= 70200
\end{array}
\begin{array}{c}
= 70.2 \text{ sq. m}
\end{array}
\]

b. The area of the playground is one and a half times that of the swimming pool. Find the total area of the swimming pool and the playground.

\[
\begin{array}{c}
782 \text{ tenths}
\end{array}
\begin{array}{c}
15 \times 10
\end{array}
\begin{array}{c}
= 702 \times 15
\end{array}
\]

\[
\begin{array}{c}
+ 70200
\end{array}
\begin{array}{c}
\text{area of playground}
\end{array}
\begin{array}{c}
17530 \text{ total area}
\end{array}
\]

EUREKA MATH® | Lesson 18: Relate decimal and fraction multiplication.
1. Convert. Express your answer as a mixed number, if possible. The first one is done for you.

<table>
<thead>
<tr>
<th>a. 2 ft = ( \frac{2}{3} ) yd</th>
<th>b. 4 ft = 1 ( \frac{\frac{1}{3}}{3} ) yd</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 ft = 2 \times 1 ft</td>
<td>4 ft = 4 \times 1 ft</td>
</tr>
<tr>
<td>= 2 \times \frac{1}{3} \text{ yd}</td>
<td>= 4 \times \frac{1}{3} \text{ yd}</td>
</tr>
<tr>
<td>= \frac{2}{3} \text{ yd}</td>
<td>= \frac{4}{3} \text{ yd}</td>
</tr>
<tr>
<td></td>
<td>= 1 ( \frac{1}{3} ) yd</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>c. 7 in = ( \frac{7}{12} ) ft</th>
<th>d. 13 in = 1 ( \frac{1}{12} ) ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 7 \times 1 \text{ in}</td>
<td>= 13 \times 1 \text{ in}</td>
</tr>
<tr>
<td>= 7 \times \frac{1}{12} \text{ ft}</td>
<td>= 13 \times \frac{1}{12} \text{ ft}</td>
</tr>
<tr>
<td>= \frac{7}{12} \text{ ft}</td>
<td>= 1 \frac{1}{12} \text{ ft}</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>e. 5 oz = ( \frac{5}{16} ) lb</th>
<th>f. 18 oz = 1 ( \frac{1}{8} ) lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 5 \times 1 \text{ oz}</td>
<td>= 18 \times 1 \text{ oz}</td>
</tr>
<tr>
<td>= 5 \times \frac{1}{16} \text{ lb}</td>
<td>= 18 \times \frac{1}{16} \text{ lb}</td>
</tr>
<tr>
<td>= \frac{5}{16} \text{ lb}</td>
<td>= \frac{18}{16} \text{ lb}</td>
</tr>
<tr>
<td></td>
<td>= 1 \frac{2}{16} \text{ lb} = 1 \frac{1}{8} \text{ lb}</td>
</tr>
</tbody>
</table>
2. Regina buys 24 inches of trim for a craft project.
   a. What fraction of a yard does Regina buy?

   \[ 24 \text{ in} = \frac{24}{36} \text{ yd} = \frac{2}{3} \text{ yd} \]

   Regina buys \( \frac{2}{3} \) yard

   b. If a whole yard of trim costs \$6, how much did Regina pay?

   \[ \frac{2}{3} \text{ of } \$6 = \frac{2}{3} \times \frac{6}{1} = 4 \] Regina paid \$4

3. At Yo-Yo Yogurt, the scale says that Sara has 8 ounces of vanilla yogurt in her cup. Her father’s yogurt weighs 11 ounces. How many pounds of frozen yogurt did they buy altogether? Express your answer as a mixed number.

   Sara [8 oz]
   Father [11 oz]
   19 oz total

   \[ 19 \text{ oz} = \frac{19}{16} \text{ lb} \]

   They bought \( 1\frac{3}{16} \) lb of yogurt altogether

4. Pheng-Xu drinks 1 cup of milk every day for lunch. How many gallons of milk does he drink in 2 weeks?

   1 week = 7 days
   2 weeks = 14 days
   14 days @ 1 cup per day = 14 cups
   Pheng-Xu drank \( \frac{7}{8} \) gallon of milk in 2 weeks

   \[ 14 \text{ cups} = \frac{14}{16} \text{ gallons} = 1 \frac{3}{16} \text{ gallons} \]
1. Convert. Express your answer as a mixed number, if possible.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. $2 \text{ ft} = \frac{2}{3} \text{ yd}$</td>
<td>b. $6 \text{ ft} = \frac{2}{3} \text{ yd}$</td>
</tr>
<tr>
<td>$2 \text{ ft} = 2 \times 1 \text{ ft}$</td>
<td>$6 \text{ ft} = 6 \times 1 \text{ ft}$</td>
</tr>
<tr>
<td>$= 2 \times \frac{1}{3} \text{ yd}$</td>
<td>$= 6 \times \frac{1}{3} \text{ yd}$</td>
</tr>
<tr>
<td>$= \frac{2}{3} \text{ yd}$</td>
<td>$= \frac{6}{3} \text{ yd}$</td>
</tr>
<tr>
<td>c. $5 \text{ in} = \frac{5}{12} \text{ ft}$</td>
<td>d. $14 \text{ in} = \frac{14}{6} \text{ ft}$</td>
</tr>
<tr>
<td>$5 \text{ in} = 5 \times 1 \text{ in}$</td>
<td>$14 \text{ in} = 14 \times 1 \text{ in}$</td>
</tr>
<tr>
<td>$= 5 \times \frac{1}{12} \text{ ft}$</td>
<td>$= 14 \times \frac{1}{12} \text{ ft}$</td>
</tr>
<tr>
<td>$= \frac{5}{12} \text{ ft}$</td>
<td>$= \frac{14}{12} \text{ ft}$</td>
</tr>
<tr>
<td>$= \frac{5}{12} \text{ ft}$</td>
<td>$= \frac{14}{12} \text{ ft}$</td>
</tr>
<tr>
<td>e. $7 \text{ oz} = \frac{7}{16} \text{ lb}$</td>
<td>f. $20 \text{ oz} = \frac{14}{8} \text{ lb}$</td>
</tr>
<tr>
<td>$7 \text{ oz} = 7 \times 1 \text{ oz}$</td>
<td>$20 \text{ oz} = 20 \times 1 \text{ oz}$</td>
</tr>
<tr>
<td>$= 7 \times \frac{1}{16} \text{ lb}$</td>
<td>$= 20 \times \frac{1}{16} \text{ lb}$</td>
</tr>
<tr>
<td>$= \frac{7}{16} \text{ lb}$</td>
<td>$= \frac{20}{16} \text{ lb}$</td>
</tr>
<tr>
<td>$= \frac{7}{16} \text{ lb}$</td>
<td>$= \frac{20}{16} \text{ lb}$</td>
</tr>
<tr>
<td>g. $1 \text{ pt} = \frac{1}{2} \text{ qt}$</td>
<td>h. $4 \text{ pt} = \frac{2}{2} \text{ qt}$</td>
</tr>
<tr>
<td>$1 \text{ pt} = 1 \times 1 \text{ pt}$</td>
<td>$4 \text{ pt} = 4 \times 1 \text{ pt}$</td>
</tr>
<tr>
<td>$= 1 \times \frac{1}{2} \text{ qt}$</td>
<td>$= 4 \times \frac{1}{2} \text{ qt}$</td>
</tr>
<tr>
<td>$= \frac{1}{2} \text{ qt}$</td>
<td>$= \frac{4}{2} \text{ qt}$</td>
</tr>
<tr>
<td>$= \frac{1}{2} \text{ qt}$</td>
<td>$= 2 \text{ qt}$</td>
</tr>
</tbody>
</table>
   a. What fraction of a pound of granola did Marty buy?
      
      \[ 12 \text{ oz} = \_ \_ \text{ lb} \]
      
      \[ 12 \text{ oz} = 12 \times 1 \text{ oz} \]
      
      \[ = 12 \times \frac{1}{16} \text{ lb} \]
      
      \[ = \frac{12}{16} \text{ lb} = \frac{3}{4} \text{ lb} \]
   
   b. If a whole pound of granola costs $4, how much did Marty pay?
      
      \[ \frac{3}{4} \text{ lb} \times \$4 = \]
      
      \[ \frac{3}{4} \times 4 = 3 \]
      
      Marty paid $3 for \( \frac{3}{4} \) lb of granola.

3. Sara and her dad visit Yo-Yo Yogurt again. This time, the scale says that Sara has 14 ounces of vanilla yogurt in her cup. Her father's yogurt weighs half as much. How many pounds of frozen yogurt did they buy altogether on this visit? Express your answer as a mixed number.
   
   Sara (14 oz)
   
   Father (7 oz)
   
   21 oz total
   
   \[ 21 \text{ oz} = \_ \_ \text{ lb} \]
   
   \[ 21 \text{ oz} = 21 \times 1 \text{ oz} \]
   
   \[ = 21 \times \frac{1}{16} \text{ lb} \]
   
   \[ = \frac{21}{16} \text{ lb} = 1 \frac{5}{16} \text{ lbs yogurt altogether} \]

4. An art teacher uses 1 quart of blue paint each month. In one year, how many gallons of paint will she use?
   
   \[ 1 \text{ qt} \times 12 \text{ months} = 12 \text{ qt per year} \]
   
   \[ 12 \text{ qt} = \_ \_ \text{ gal} \]
   
   \[ 12 \text{ qt} = 12 \times 1 \text{ qt} \]
   
   \[ = 12 \times \frac{1}{4} \text{ gal} = \frac{12}{4} \text{ gal} = 3 \text{ gallons in one year} \]
1. Convert. Show your work. Express your answer as a mixed number. (Draw a tape diagram if it helps you.) The first one is done for you.

   a. \( \frac{2}{3} \text{yd} = \frac{8}{3} \text{ft} \)
      \[ \begin{align*}
      \frac{2}{3} \text{yd} &= \frac{2}{3} \times 1 \text{yd} \\
      &= \frac{2}{3} \times 3 \text{ ft} \\
      &= \frac{8}{3} \times 3 \text{ ft} \\
      &= \frac{24}{3} \text{ ft} \\
      &= 8 \text{ ft}
      \end{align*} \]

   b. \( 1\frac{1}{2} \text{qt} = \frac{3}{4} \text{gal} \)
      \[ \begin{align*}
      1\frac{1}{2} \text{qt} &= 1 \frac{1}{2} \times 1 \text{qt} \\
      &= \frac{3}{2} \times \frac{1}{4} \text{gal} \\
      &= \frac{3}{8} \text{gal}
      \end{align*} \]

   c. \( 4\frac{2}{3} \text{ft} = \frac{56}{3} \text{in} \)
      \[ \begin{align*}
      4\frac{2}{3} \text{ft} &= 4 \frac{2}{3} \times 1 \text{ft} \\
      &= \frac{14}{3} \times 12 \text{ in} \\
      &= \frac{14}{3} \times 12 \frac{4}{9} \text{ in} \\
      &= 56 \text{ in}
      \end{align*} \]

   d. \( 9\frac{1}{2} \text{pt} = \frac{19}{2} \text{qt} \)
      \[ \begin{align*}
      9\frac{1}{2} \text{pt} &= 9 \frac{1}{2} \times 1 \text{pt} \\
      &= \frac{19}{2} \times \frac{1}{4} \text{qt} \\
      &= \frac{19}{8} \text{qt} \\
      &= 4 \frac{3}{8} \text{qt}
      \end{align*} \]

   e. \( 3\frac{3}{5} \text{hr} = \frac{216}{5} \text{min} \)
      \[ \begin{align*}
      3\frac{3}{5} \text{hr} &= 3 \frac{3}{5} \times 1 \text{hr} \\
      &= 3 \frac{3}{5} \times 60 \text{ min} \\
      &= \frac{18}{5} \times \frac{60}{1} \text{ min} \\
      &= 216 \text{ min}
      \end{align*} \]

   f. \( 3\frac{2}{3} \text{ft} = \frac{12}{3} \text{yd} \)
      \[ \begin{align*}
      3\frac{2}{3} \text{ft} &= 3 \frac{2}{3} \times 1 \text{ft} \\
      &= 3 \frac{2}{3} \times \frac{1}{3} \text{yd} \\
      &= \frac{11}{3} \times \frac{1}{3} \text{yd} \\
      &= \frac{11}{9} \text{yd} \\
      &= 1 \frac{2}{9} \text{yd}
      \end{align*} \]
2. Three dump trucks are carrying topsoil to a construction site. Truck A carries 3,545 lb, Truck B carries 1,758 lb, and Truck C carries 3,697 lb. How many tons of topsoil are the 3 trucks carrying altogether?

\[
\begin{array}{ccc}
\text{A} & \text{B} & \text{C} \\
3545 \text{ lb} & 1758 \text{ lb} & 3697 \text{ lb} \\
\frac{3545}{1758} & + \frac{3697}{1758} & \frac{9000 \text{ lb}}{1758} \\
= 2 & + 3 & 9000 \\
\frac{9000}{1758} & = 5 & \frac{1000}{1758} \\
= 4 & \frac{1}{2} & \text{tons}
\end{array}
\]

3. Melissa buys \(3\frac{3}{4}\) gallons of iced tea. Denita buys 7 quarts more than Melissa. How much tea do they buy altogether? Express your answer in quarts.

\[
\begin{array}{c}
\text{Melissa} \\
3\frac{3}{4} \text{ gal} \\
\text{Denita} \\
3\frac{3}{4} \text{ gal} + 7 \text{ qt}
\end{array}
\]

\[
3\frac{3}{4} \text{ gal} = 3\frac{3}{4} \times 1 \text{ gal} = \frac{15}{4} \times 4 \text{ qt} = 15 \text{ qt}
\]

\[
3\frac{3}{4} \text{ gal} = 15 \text{ qt}
\]

4. Marvin buys a hose that is \(27\frac{3}{4}\) feet long. He already owns a hose at home that is \(2\frac{2}{3}\) the length of the new hose. How many total yards of hose does Marvin have now?

\[
\begin{align*}
\text{New Hose} & = 27\frac{3}{4} \text{ ft} \\
\text{Old Hose} & = 18\frac{2}{3} \text{ ft} \\
\frac{27}{4} \times \frac{2}{3} & = \frac{27}{4} \times \frac{2}{3} = 18\frac{1}{2} \text{ ft} \\
46\frac{1}{4} \text{ ft} & = 46\frac{1}{4} \text{ ft} \text{ total}
\end{align*}
\]
1. Convert. Show your work. Express your answer as a mixed number. The first one is done for you.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>( \frac{2}{3} \text{yd} = \text{?? ft} )</td>
</tr>
<tr>
<td></td>
<td>[ \frac{2}{3} \text{yd} = \frac{2}{3} \times 1 \text{yd} = \frac{2}{3} \times 3 \text{ ft} = \frac{2}{3} \times 3 = \frac{2}{3} \times 3 = \frac{2}{3} \times 3 = 8 \text{ ft} ]</td>
</tr>
<tr>
<td>b.</td>
<td>( 1\frac{1}{4} \text{ft} = \text{?? yd} )</td>
</tr>
<tr>
<td></td>
<td>[ 1\frac{1}{4} \text{ft} = 1\frac{1}{4} \times 1 \text{ft} = \frac{1}{4} \times \frac{1}{4} \text{yd} = \frac{1}{3} \times \frac{1}{3} \text{yd} = \frac{5}{12} \text{yd} ]</td>
</tr>
<tr>
<td>c.</td>
<td>( 3\frac{5}{6} \text{ft} = \text{?? in} )</td>
</tr>
<tr>
<td></td>
<td>[ 3\frac{5}{6} \text{ft} = 3\frac{5}{6} \times 1 \text{in} = 3\frac{5}{6} \times 12 \text{ in} = \frac{21}{2} \times \frac{12}{1} \text{ in} = 46 \text{ in} ]</td>
</tr>
<tr>
<td>d.</td>
<td>( 7\frac{1}{2} \text{pt} = \text{?? qt} )</td>
</tr>
<tr>
<td></td>
<td>[ 7\frac{1}{2} \text{pt} = 7\frac{1}{2} \times 1 \text{pt} = \frac{15}{2} \times \frac{1}{2} \text{ qt} = \frac{15}{4} \text{ qt} = 3\frac{3}{4} \text{ qt} ]</td>
</tr>
<tr>
<td>e.</td>
<td>( 4\frac{3}{10} \text{hr} = \text{?? min} )</td>
</tr>
<tr>
<td></td>
<td>[ 4\frac{3}{10} \text{hr} = 4\frac{3}{10} \times 1 \text{hr} = \frac{43}{10} \times 60 \text{ min} = \frac{43}{10} \times \frac{60}{1} \text{ min} = 258 \text{ min} ]</td>
</tr>
<tr>
<td>f.</td>
<td>( 33 \text{ months} = \text{?? years} )</td>
</tr>
</tbody>
</table>
|   | \[ 33 \text{ months} = 33 \times 1 \text{ month} = 33 \times \frac{1}{12} \text{ yr} = \frac{11}{4} \text{ yr} = 2\frac{3}{4} \text{ yr} \]
2. Four members of a track team run a relay race in 165 seconds. How many minutes did it take them to run the race? $165\text{ sec}$

\[
165\text{ sec} = \frac{165}{60}\text{ min} = \frac{33}{12}\text{ min} = 2\frac{9}{12}\text{ min} = 2\frac{3}{4}\text{ minutes}
\]

3. Horace buys $2\frac{3}{4}$ pounds of blueberries for a pie. He needs 48 ounces of blueberries for the pie. How many more pounds of blueberries does he need to buy?

\[
2\frac{3}{4}\text{ lb} = \frac{2 \cdot 4 + 3}{4}\text{ lb} = \frac{11}{4}\text{ lb}
\]

\[
48 = 4 \cdot 12\text{ oz}
\]

\[
40\text{ oz} = 4 \cdot \frac{1}{4}\text{ lb}
\]

\[
40\text{ oz} = 4 \cdot \frac{1}{4}\text{ lb}
\]

\[
\frac{40\text{ oz}}{4\text{ oz}} = \frac{1}{4}\text{ lb}
\]

Horace needs $\frac{1}{4}$ lb more blueberries.

4. Tiffany is sending a package that may not exceed 16 pounds. The package contains books that weigh a total of $9\frac{3}{8}$ pounds. The other items to be weighed $\frac{3}{5}$ the weight of the books. Will Tiffany be able to send the package?

\[
\frac{3}{5} \cdot 9\frac{3}{8} = \frac{3}{5} \cdot \frac{75}{8} = \frac{3 \cdot 75}{5 \cdot 8} = \frac{225}{40} = \frac{45}{8} = 5\frac{5}{8}\text{ lb}
\]

\[
9\frac{3}{8}\text{ lb books} + 5\frac{5}{8}\text{ lb items} = 15\frac{3}{8}\text{ lb}
\]

Yes, Tiffany's package weighs 15 lbs.