

# Fractions and Decimals

## Student Guide

Math 6 Unit 3 Accelerated  
Part 2

### Glossary

Term	Definition	
<b>common factor</b>	<p>When two numbers have the same factor, we call that a common factor.</p> <p>For example, 2 is a factor of 8 and also of 12, so 2 is a common factor of 8 and 12.</p>	<p><b>Factors of 8</b> 1, 2, 4, 8</p> <p><b>Factors 12</b> 1, 2, 3, 4, 6, 12</p>
<b>common multiple</b>	<p>When two numbers have the same multiple, we call that a common multiple.</p> <p>For example, 12 is a multiple of 2 and also of 3, so 12 is a common multiple of 2 and 3.</p>	<p><b>Multiples of 2</b> 2, 4, 6, 8, 10, 12, . . .</p> <p><b>Multiples of 3</b> 3, 6, 9, 12, 15, 18, . . .</p>
<b>greatest common factor (GCF)</b>	<p>The greatest common factor (GCF) is the largest number that is a common factor of two numbers.</p> <p>The common factors of 8 and 12 are 1, 2, and 4. The greatest common factor is 4.</p>	
<b>least common multiple (LCM)</b>	<p>The least common multiple (LCM) is the smallest number that is a common multiple of two numbers.</p> <p>The common multiples of 2 and 3 are 6, 12, 18, . . .</p> <p>The least common multiple is 6.</p>	
<b>long division</b>	<p>Long division is a way to divide numbers in decimal form. When we use long division, we determine the quotient one digit at a time, from left to right.</p> <p>For example, here is the long division for <math>57 \div 4</math>.</p>	$\begin{array}{r} 13.25 \\ 8 \overline{) 106.00} \\ \underline{-8} \phantom{00} \\ 26 \phantom{00} \\ \underline{-24} \phantom{00} \\ 20 \phantom{00} \\ \underline{-16} \phantom{00} \\ 40 \phantom{00} \\ \underline{-40} \phantom{00} \\ 0 \end{array}$

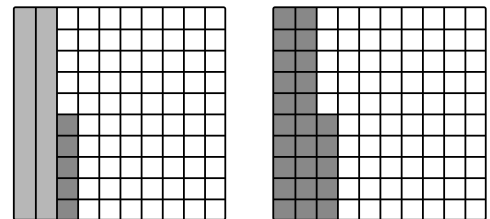
### Unit 5 Summary

Prior Learning	Math 6, Unit 5	Future Learning
Grades 4–5 <ul style="list-style-type: none"> <li>Rewriting decimals as fractions</li> <li>Multiplying and dividing whole numbers</li> <li>Place value with decimals</li> </ul> Math 6, Unit 4 <ul style="list-style-type: none"> <li>Dividing fractions</li> </ul>	<ul style="list-style-type: none"> <li>Adding and subtracting decimals</li> <li>Multiplying and dividing decimals</li> <li>Least common multiple and greatest common factor</li> </ul>	Math 6, Unit 6 <ul style="list-style-type: none"> <li>Solving equations with decimals and fractions</li> </ul> Math 7 and 8 <ul style="list-style-type: none"> <li>Operations with positive and negative numbers</li> <li>Converting fractions to decimals</li> </ul>

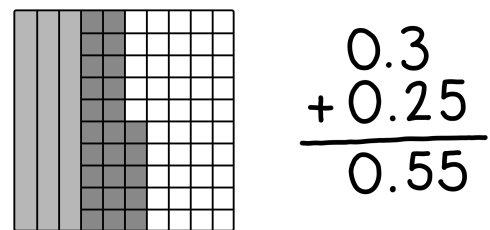
### Adding and Subtracting Decimals

When adding and subtracting decimals, it is important to consider the **place value** of each digit.

We can think about 0.25 as 2 tenths and 5 hundredths or as 25 hundredths.

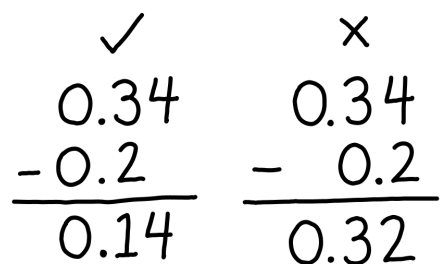


We can think about  $0.3 + 0.25$  as 3 tenths and 25 hundredths. This is the same as 30 hundredths + 25 hundredths, which is 55 hundredths, or 0.55.



Rewriting addition and subtraction problems vertically can help us keep the place values organized.

On the left, we are correctly subtracting 2 tenths from 34 hundredths. On the right, we are subtracting 2 hundredths instead of 2 tenths.



### Multiplying and Dividing Decimals

It can be helpful to rewrite multiplication and division problems that have decimals by changing the decimals into whole numbers.

#### Multiplication

When we write  $0.3 \cdot 0.04$  as fractions we can multiply whole numbers, and then think about the place value.

$$\begin{aligned} 0.3 \cdot 0.04 &= 3 \cdot 4 \cdot \frac{1}{10} \cdot \frac{1}{100} \\ &= 12 \cdot \frac{1}{1000} \\ &= 0.012 \end{aligned}$$

#### Division

When we write 3 as  $\frac{30}{10}$  in the problem below, we are setting up a common denominator so that we can divide whole numbers.

$$\begin{aligned} 3 \div 0.2 &= \frac{30}{10} \div \frac{2}{10} \\ &= 30 \div 2 \\ &= 15 \end{aligned}$$

### Least Common Multiple and Greatest Common Factor

Here are lists of multiples of 3 and 4.

Common multiples of 3 and 4 are 12 and 24.

So the *least common multiple (LCM)* is 12.

#### Multiples of 3

3, 6, 9, 12, 15, 18, 21, 24, ...

#### Multiples of 4

4, 8, 12, 16, 20, 24, 28, 32, ...

1, 2, 4, and 8 all divide into 8 evenly. These are called its factors.

Here are lists of factors of 8 and 12.

Common factors of 8 and 12 are 1, 2, and 4.

So the *greatest common factor (GCF)* is 4.

#### Factors of 8

1, 2, 4, 8

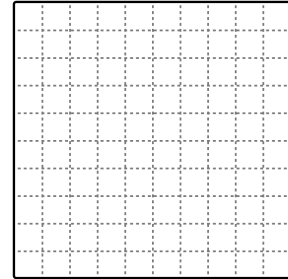
#### Factors 12

1, 2, 3, 4, 6, 12

### Try This at Home

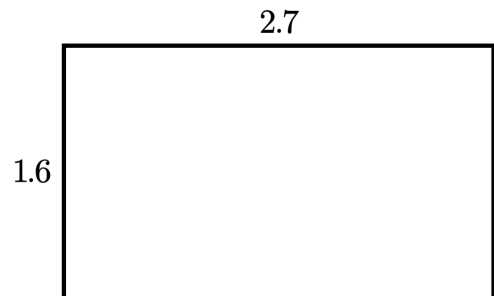
#### Adding and Subtracting Decimals

- 1.1 Add  $0.6 + 0.32$ .
- 1.2 Add  $0.125 + 5.42$ .
- 1.3 Subtract  $0.6 - 0.32$ .
- 1.4 Subtract  $1 - 0.238$ .
- 1.5 If you are checking out at the grocery store, make a prediction about the total bill. What other operations with decimals can you find on the receipt?



#### Multiplying and Dividing Decimals

- 2.1 Multiply  $0.6 \cdot 0.02$ .
- 2.2 Find the area of the rectangle.
- 2.3 Divide  $0.27 \div 0.03$ .
- 2.4 Divide  $45 \div 0.9$ .
- 2.5 If you are at a gas station, make a prediction about how much the gas will cost. How close did you get? How might you improve your prediction?



#### Least Common Multiple and Greatest Common Factor

- 3.1 What is the least common multiple of 6 and 8?
- 3.2 What is the greatest common factor of 12 and 30?
- 3.3 If you are grocery shopping, how many hot dogs come in each pack? What about buns? Discuss what combinations of packs could help you avoid leftovers.



# Amplify Desmos Math

## Unit 6.5, Family Resource

### Solutions:

1.1 0.92

1.2 5.545

1.3 0.28

1.4 0.762

1.5 *Responses vary.*

2.1 0.012

2.2 4.32 square units

2.3 9

2.4 50

2.5 *Responses vary.*


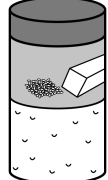
3.1 24

3.2 6

3.3 *Responses vary.*

**My Notes**

Fatima is making cheesy potatoes. She needs 5 russet potatoes and 1 container of parmesan cheese.

Russet Potato	Parmesan Cheese
 <p>\$0.94</p>	 <p>\$4.38</p>

1.1 About how much will it cost to buy these ingredients?

**Responses vary.**

$$1 + 1 + 1 + 1 + 1 + 4.50 = \$9.50.$$

1.2 If Fatima pays with \$10.00, will she have money left over? Explain or show your thinking.

**Yes. Explanations vary. When I estimated her cost, I rounded each cost up, so the actual items will cost less than \$9.50.**

2. What advice would you give someone estimating costs at the grocery store?

**Responses vary. I would recommend rounding up all of your prices to the nearest dollar because you probably will also need to pay tax.**

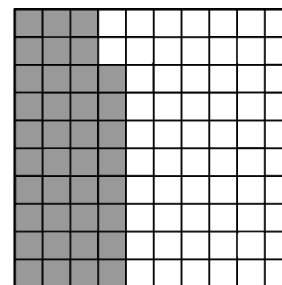
**Summary**

I can use decimals to estimate and calculate with money.

**My Notes**

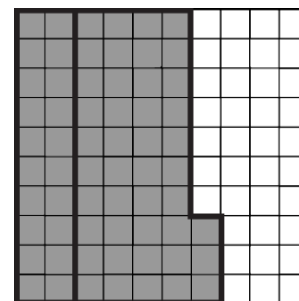
1. Select **all** the descriptions that represent the diagram.

- 38 tenths
- 38 hundredths
- 8 tenths, 3 hundredths
- 3 tenths, 8 hundredths
- 2 tenths, 18 hundredths



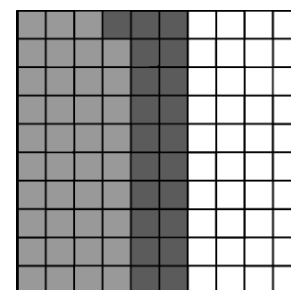
2. Determine the value of  $0.2 + 0.43$ . Use the diagram if it helps you with your thinking.

0.63



3. Determine the value of  $0.6 - 0.21$ . Use the diagram if it helps you with your thinking.

0.39



**Summary**

- I can represent decimals using tenths, hundredths, and thousandths.
- I can use diagrams to add and subtract decimals.



**My Notes**

1. Describe a strategy for adding decimals like  $0.106 + 0.35$ .

**Responses vary. You can add by place value. So add tenths to tenths and hundredths to hundredths for example. Rewriting the problem vertically and lining up the numbers by their place value can help.**

- 2.1 Here is the work Arjun did to subtract  $3.7 - 1.14$ .  
What would you say to help him understand his mistake?

**I would remind Arjun that 3.7 is the same as 3 and 70 hundredths. He can subtract 14 hundredths from 70 hundredths.**

$$\begin{array}{r} 3.7 \\ - 1.14 \\ \hline 2.64 \end{array}$$

- 2.2 Calculate  $3.7 - 1.14$ .

2.56

**Summary**

I can use diagrams, vertical calculations, and place value to add and subtract decimals.

**My Notes**

Here is how Natalia calculated  $1.58 - 1.2$ .

- 1.1 Explain why Natalia's answer does not make sense.

$$\begin{array}{r} 1.58 \\ - 1.2 \\ \hline 4.6 \end{array}$$

**Responses vary. Natalia should expect her answer to be close to 0.**

- 1.2 Calculate  $1.58 - 1.2$ .

0.38

Determine the missing digits in each number puzzle.

2.1

$$\begin{array}{r} 3.8 \\ + \boxed{4}.5 \\ \hline 8.\boxed{3} \end{array}$$

2.2

$$\begin{array}{r} 6.2 \\ - \boxed{2}.5 \\ \hline 3.\boxed{7} \end{array}$$

2.3

$$\begin{array}{r} 8.8 \\ - \boxed{4}.2\boxed{6} \\ \hline 4.\boxed{5}4 \end{array}$$

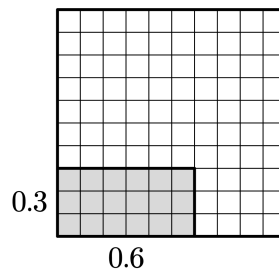
**Summary**

I can add and subtract decimals using different strategies.

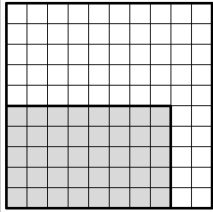
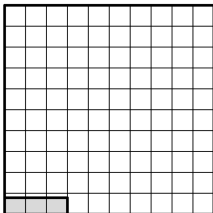
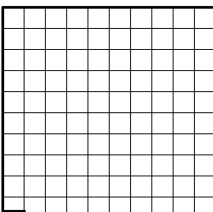
**My Notes**

1. Explain why  $0.6 \cdot 0.3 = 0.18$ .

**Responses vary.**  $0.6 \cdot 0.3$  is equal to the area of the rectangle, which is 18 hundredths or 0.18.



Use the given information to complete each row.

	Decimals	Area	Fractions	Product
2.1	$0.8 \cdot 0.5$		$\frac{8}{10} \cdot \frac{5}{10}$	0.4
2.2	$0.3 \cdot 0.08$		$\frac{3}{10} \cdot \frac{8}{100}$	0.024
2.3	$0.09 \cdot 0.03$		$\frac{9}{100} \cdot \frac{3}{100}$	0.0027

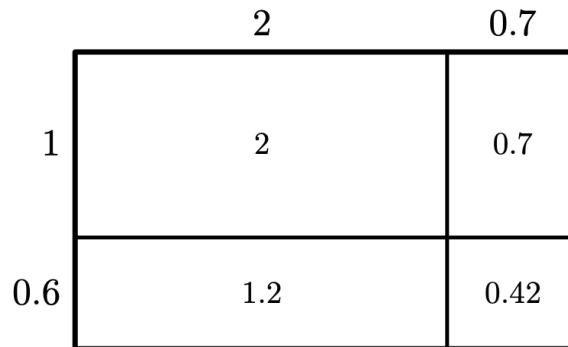
**Summary**

I can use area to reason about decimal multiplication.

I can use fractions to multiply decimals.

**My Notes**

- 1.1 An area model for  $2.7 \cdot 1.6$  has been split into parts. Calculate the area of each part.

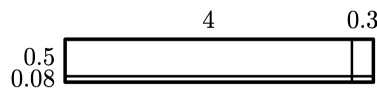


- 1.2 Use your work above to calculate  $2.7 \cdot 1.6$ .

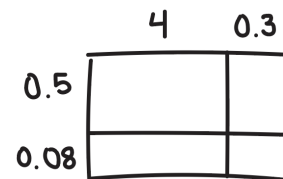
$$2 + 0.7 + 1.2 + 0.42 = 4.32$$

Jasmine drew two area models to multiply  $4.3 \cdot 0.58$ .

**To Scale**



**Not to Scale**



- 2.1 Use either drawing to calculate  $4.3 \cdot 0.58$ .

$$2 + 0.15 + 0.32 + 0.024 = 2.494$$

**Summary**

I can use area models to represent and calculate products of decimals.

1. Miko wrote this expression to calculate  $7.2 \cdot 0.19$ .

$$72 \cdot 19 \cdot \frac{1}{10} \cdot \frac{1}{100}$$

If  $72 \cdot 19 = 1368$ , then what is  $7.2 \cdot 0.19$ ?

- A. 0.1368    **B. 1.368**    C. 13.68    D. 136.8

Explain your thinking.

**Responses vary.**  $\frac{1}{10} \cdot \frac{1}{100} = \frac{1}{1000}$ , so  $72 \cdot 19$  will be 1368 thousandths.

2.  $16 \cdot 12 = 192$ .

Select **all** of the expressions that equal 0.192.

- $1.6 \cdot 1.2$         $0.16 \cdot 1.2$         $1.6 \cdot 0.12$   
  $0.16 \cdot 0.12$         $16 \cdot 0.012$

3. Calculate  $0.15 \cdot 0.23$ .

0.0345

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### Summary

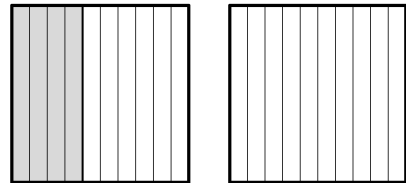
- |   |
|---|
| <input type="checkbox"/> I can use the product of whole numbers to calculate the product of decimals. |
| <input type="checkbox"/> I can multiply decimals using different strategies.                          |

**My Notes**

1. The large square is 1.

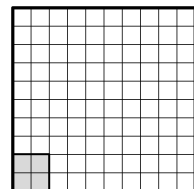
Explain how we can use this diagram to help us determine the value of  $2 \div 0.4$ .

**Responses vary. We can count how many groups of 0.4 fit into 2.**



2. Juan claims that  $1 \div 0.04$  has the same value as  $100 \div 4$ . Explain why this makes sense.

**Responses vary.  $1 \div 0.04$  is the same as  $\frac{100}{100} \div \frac{4}{100}$ , which is equal to  $100 \div 4$ .**



3. Select **all** of the expressions that have the same value as  $1.5 \div 0.05$ .

$\frac{15}{10} \div \frac{5}{10}$

$\frac{15}{100} \div \frac{5}{100}$

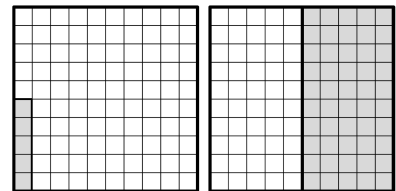
$\frac{150}{100} \div \frac{5}{100}$

$15 \div 5$

$150 \div 5$

4. Determine the value of  $1.5 \div 0.05$ .

30



**Summary**

- I can use a hundredths chart and reasoning to divide decimals.
- I can make connections between decimal division and dividing fractions with common denominators.

**My Notes**

1. Marco made an error while dividing  $1950 \div 15$ .

$$\begin{array}{r} 13 \\ 15 \overline{)1950} \\ \underline{-15} \phantom{0} \\ 45 \\ \underline{-45} \\ 0 \end{array}$$

Find the error and help him fix it.

**Explanations vary. Marco needs to continue dividing. 13 groups of 15 make 195, so 130 groups of 15 will make 1950.**

- 2.1 Select **all** of the expressions that have the same value as  $3.27 \div 0.03$ .

$327 \div 3$

$327 \div 30$

$\frac{327}{10} \div \frac{3}{100}$

$\frac{327}{100} \div \frac{3}{100}$

- 2.2 Which of these expressions would you use to calculate  $3.27 \div 0.03$ ? Explain your reasoning.

**Responses vary.  $327 \div 3$  is a whole number division problem with the same quotient as the original problem.**

- 2.3 Calculate  $3.27 \div 0.03$ .

109

**Summary**

- I can use long division or other strategies to divide decimals with no remainders.
- I can write an equivalent division expression in order to divide decimals.

**My Notes**

1. Renata made an error while calculating  $9.8 \div 5$ .

$$\begin{array}{r}
 19.6 \\
 5 \overline{) 9.80} \\
 \underline{-5} \phantom{0} \\
 48 \\
 \underline{-45} \\
 30 \\
 \underline{-30} \\
 0
 \end{array}$$

Find the error and help Renata fix it.

**Responses vary. Renata put the decimal in the wrong place in the quotient. The decimal should go after the 1. This makes sense because  $9.8 \div 5$  is close to 2.**

- 2.1 Adrian says  $9 \div 1.2$  has the same value as  $90 \div 12$ . Explain why this makes sense.

**Explanations vary. 9 is 90 tenths and 1.2 is 12 tenths.**

$\frac{90}{10} \div \frac{12}{10}$  is the same as  $90 \div 12$ .

- 2.2 Calculate  $9 \div 1.2$ .

7.5

- 3.1 Circle the statement that best describes the quotient of  $5.12 \div 0.05$ ?

Less than 1

Close to 10

**Greater than 15**

- 3.2 Calculate  $5.12 \div 0.05$ .

102.4

**Summary**

I can use long division to divide two numbers and use decimals to represent remainders.



**My Notes**

1.1 Select **all** of the expressions that are equal to 2% of \$1400 .

$0.2 \cdot 1400$         $0.02 \cdot 1400$         $0.2 \div 1400$

$1400 \div 0.02$         $\frac{2}{100} \cdot 1400$

1.2 Calculate 2% of \$1400 .

28

The average cost of food per week for two people in Seattle, Washington is \$90 .

2.1 Tyler spends around \$18 on salad ingredients each week. What percent of the weekly food cost is this?

- A. 0.02%      B. 0.2%      C. 2%      **D. 20%**

2.2 Fruit makes up 6% of the weekly food cost. How much money is that?

\$5.40

**Summary**

- |   |
|---|
| <input type="checkbox"/> I can make connections between percentages and decimals.               |
| <input type="checkbox"/> I can use decimal operations to answer questions about grocery prices. |