

Chapter 2

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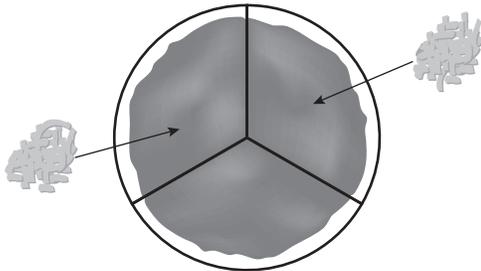
**Chapter
2****Rational Numbers**

Dear Family,

Every family has a favorite pizza. Pizzas are unusual in that the ingredients are normally customized. The variety of meats, vegetables, sauces, crusts, herbs and spices produces a dizzying number of possibilities.

You and your student might enjoy making homemade pizza. First, you have to decide how many pizzas you need and how big each will be. If there are just two people eating, a small pizza might be just right. But for a large group, several pizzas may be needed.

You might estimate that each person will eat about one fourth of a large pizza. Multiply that by the number of people eating and you know how many fourths are needed. From that, work with your student to figure out how many whole pizzas are needed.



Next you have to choose and prepare the toppings—maybe even customize the toppings for each person. As you choose the toppings, divide them so they will be evenly distributed. If two thirds of your group wants green peppers on the pizza, divide the diced green peppers into two equal piles. Divide the pizza into three equal parts and put the piles on two of the parts. Talk with your student about a strategy for doing this when you have more than one pizza.

Finally, decide how you will cut the pizza. If there are two people, you probably will choose an even number of slices. If there are five people, you might choose to cut the pizza into ten slices, so that each person can have two slices. Count the number in your group and think of a good number of slices to use. What if you have more than one pizza?

Enjoy your pizza—and don't hold the math!

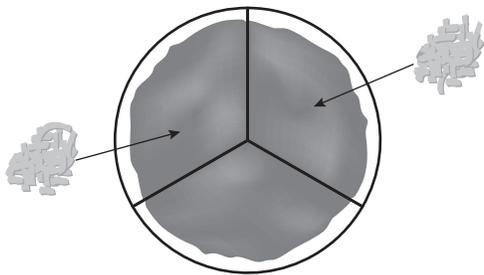
Capítulo
2**Números Racionales**

Estimada Familia:

Cada familia tiene una pizza favorita. Las pizzas no son comunes en el sentido en que los ingredientes generalmente son personalizados. La variedad de carnes, verduras, salsas, masas, hierbas y especias produce un abrumador número de posibilidades.

Usted y su estudiante pueden disfrutar preparando pizza en casa. Primero, tienen que decidir cuántas pizzas necesitan y qué tan grande será cada una. Si sólo dos personas van a comer una pizza pequeña será suficiente. Pero para un grupo grande, se necesitarán varias pizzas.

Pueden estimar que cada persona comerá alrededor de un cuarto de una pizza grande. Multipliquen eso por el número de personas que van a comer y entonces sabrán cuántos cuartos necesitarán. A partir de ese dato, trabaje con su estudiante para averiguar cuántas pizzas enteras se necesitarán.



Luego, tendrán que elegir y preparar las cubiertas—quizás incluso personalizar las cubiertas para cada persona. A medida que eligen las cubiertas, divídanlas para que queden distribuidas de manera uniforme. Si dos tercios de su grupo desean pimientos verdes en la pizza, dividan los pimientos verdes picados en dos montones iguales. Dividan la pizza en tres partes iguales y coloquen los montones en dos de las partes. Converse con su estudiante acerca de una estrategia para hacer esto cuando tienen más de una pizza.

Finalmente, decidan cómo cortarán la pizza. Si hay dos personas, probablemente elegirán un igual número de tajadas. Si son cinco personas, querrán cortar la pizza en diez tajadas, para que cada persona reciba dos. Cuenten el número de personas en su grupo y piensen acerca de un buen número de tajadas para usar. ¿Qué pasa si tienen más de una pizza?

¡Disfruten su pizza—y no dejen de usar las matemáticas!

**Activity
2.1****Start Thinking!**

For use before Activity 2.1

You eat $\frac{3}{8}$ of a pie and your sister eats $\frac{1}{4}$ of the pie. Explain who ate more of the pie.

**Activity
2.1****Warm Up**

For use before Activity 2.1

Copy and complete the statement using $<$, $>$, or $=$.

1. $\frac{2}{3} \underline{\quad ? \quad} \frac{4}{6}$

2. $0.7 \underline{\quad ? \quad} \frac{3}{4}$

3. $1.5 \underline{\quad ? \quad} \frac{2}{3}$

4. $-0.6 \underline{\quad ? \quad} -1$

5. $3\frac{7}{10} \underline{\quad ? \quad} 3\frac{4}{5}$

6. $-2.4 \underline{\quad ? \quad} -2\frac{2}{5}$

**Lesson
2.1****Start Thinking!**

For use before Lesson 2.1

You and two friends are playing basketball. You make 7 out of 15 shots. Your first friend makes 6 out of 10 shots and your second friend makes 5 out of 12 shots. Who is the better shooter?

How would you solve this problem using what you know about rational numbers?

**Lesson
2.1****Warm Up**

For use before Lesson 2.1

Order the numbers from least to greatest.

1. $-\frac{2}{3}$, 0.6, $\frac{3}{4}$, $-\frac{7}{4}$, -0.3

2. 1.5, -1.3, $\frac{7}{5}$, $-\frac{6}{5}$, 1.65

3. -2.75, $\frac{11}{4}$, $\frac{5}{4}$, -0.37, 2.65

4. $\frac{4}{10}$, -0.8, $\frac{1}{8}$, 4.5, $-\frac{4}{2}$

5. 3.8, $-\frac{9}{3}$, -0.3, $\frac{6}{4}$, $\frac{8}{5}$

6. -1.5, $\frac{7}{3}$, $-\frac{3}{4}$, 0.6, $\frac{9}{6}$

2.1 Practice A

Write the rational number as a decimal.

1. $\frac{5}{9}$

2. $-\frac{3}{8}$

3. $-\frac{3}{11}$

4. $\frac{7}{30}$

5. $1\frac{5}{12}$

6. $-2\frac{1}{3}$

7. $-\frac{13}{22}$

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

Write the decimal as a fraction or mixed number in simplest form.

9. 0.7

10. -0.3

11. -0.43

12. 0.52

13. 1.25

14. -2.07

15. 4.18

16. 3.125

Order the numbers from least to greatest.

17. $1.6, -\frac{2}{3}, -0.5, \frac{3}{2}, -\frac{5}{2}$

18. $\frac{3}{4}, -1.7, 0.6, -\frac{7}{4}, 1.1$

19. $0, -\frac{2}{5}, 0.67, \frac{7}{9}, -0.5$

20. $-\frac{1}{3}, -0.3, \frac{4}{3}, 1.2, \frac{3}{2}$

21. You receive two quarters, one dime, and four pennies back in change.

a. Write the amount as a decimal.

b. Write the amount as a fraction in simplest form.

22. In football, a completion percentage is the number of completions divided by the number of passes. Does Tom or Ian have a higher completion percentage?

Player	Passes	Completions
Tom	22	10
Ian	18	9

23. You get 17 out of 22 questions correct on a math test.

a. What is your percent of correct answers?

b. The lowest score to pass is 70%. Did you pass the test?

c. What is the minimum number of correct answers needed in order to pass the test?

2.1 Practice B

Write the rational number as a decimal.

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

2. $-\frac{3}{22}$

3. $1\frac{2}{9}$

4. $-5\frac{3}{40}$

5. $-7\frac{5}{11}$

6. $4\frac{1}{15}$

7. $-9\frac{1}{9}$

8. $-7\frac{5}{6}$

Write the decimal as a fraction or mixed number in simplest form.

9. 0.68

10. -0.01

11. -3.99

12. 8.745

13. 3.005

14. -13.012

15. -9.98

16. -10.452

17. You caught a red snapper that is $8\frac{5}{12}$ inches long. Your friend caught a red snapper that is $8\frac{6}{13}$ inches long. Who caught the larger red snapper?

Copy and complete the statement using $<$, $>$, or $=$.

18. $0.13 \underline{\quad ? \quad} \frac{1}{8}$

19. $-1\frac{2}{9} \underline{\quad ? \quad} -\frac{5}{4}$

20. $-5.175 \underline{\quad ? \quad} -5\frac{1}{6}$

21. Find one terminating decimal and one repeating decimal between $-1\frac{1}{2}$ and $-1\frac{7}{9}$.

22. The table gives the tidal changes in the water level of a lagoon for every six hours of a given day.

Time	4:00 A.M.	10:00 A.M.	4:00 P.M.	10:00 P.M.
Change (feet)	2.25	$-2\frac{6}{7}$	$-\frac{3}{2}$	$2\frac{1}{3}$

- Order the numbers from least to greatest.
- At what time(s) did the water level decrease?
- What was the largest change in water level?
- Did the tidal change in part (c) involve an increase or a decrease in water level?
- Will the next tidal change be an increase or decrease in water level? Explain.

2.1 Enrichment and Extension

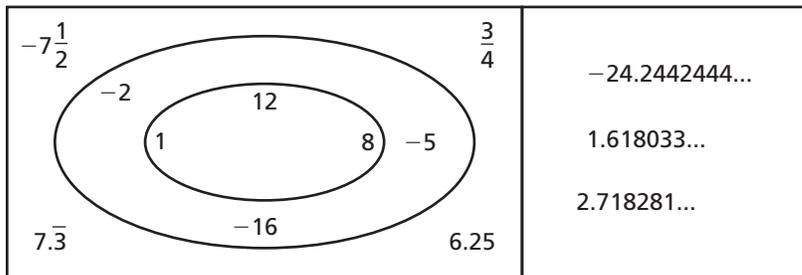
Where do I Belong?

An **irrational number** is a decimal that goes on forever and does not repeat. Irrational numbers cannot be written as fractions.

Examples: 3.14159..., $-0.010110111\dots$, 2.2360679...

A **real number** is any number that is either rational or irrational.

The Venn diagram shows how real numbers, rational numbers, irrational numbers, integers, and whole numbers are related.



- Describe any patterns you notice with the numbers.
- Place the name of each number type in its appropriate spot.

Real number Rational number Irrational number Integer Whole number

For each real number, tell whether it is **rational**, **irrational**, an **integer**, and/or a **whole number**. You may have more than one answer.

- $4\frac{2}{3}$
- $-32\bar{3}$
- $0.919911\dots$
- 15

- Can you write 2 as a fraction? Are all whole numbers also rational numbers?
- Can you write -14 as a fraction? Are all integers also rational numbers?

Complete the statement with **always**, **sometimes**, or **never**.

- A **real number** chosen at random is ? an **integer**.
- An **integer** chosen at random is ? a **real number**.
- An **irrational number** chosen at random is ? a **rational number**.
- A **rational number** chosen at random is ? an **integer**.
- A **whole number** chosen at random is ? a **rational number**.



Puzzle Time

Did You Hear About...

A	B	C	D	E	F
G	H	I	J	K	L
M	N	O	P	Q	R

Complete each exercise. Find the answer in the answer column. Write the word under the answer in the box containing the exercise letter.

4.16 WRITE
-0.375 STUDENT
-3.875 COULDN'T
-0.416 WHO
0.125 WATERPROOF
$5\frac{11}{200}$ HAVE
$\frac{27}{40}$ GOLDFISH
$-1\frac{13}{50}$ HE
$-\frac{7}{10}$ ESSAY

Write the rational number as a decimal.

- | | |
|--------------------|--------------------|
| A. $\frac{8}{9}$ | B. $-\frac{3}{8}$ |
| C. $-\frac{5}{12}$ | D. $\frac{23}{30}$ |
| E. $1\frac{3}{4}$ | F. $-3\frac{7}{8}$ |
| G. $4\frac{1}{6}$ | H. $4\frac{4}{25}$ |

Write the decimal as a fraction or mixed number in simplest form.

- | | |
|----------|------------|
| I. -0.7 | J. 0.84 |
| K. 0.675 | L. -0.252 |
| M. -1.26 | N. -2.78 |
| O. 5.055 | P. -11.688 |
- Q. You eat one slice of a pizza that is cut into 8 even slices. What is the amount you ate written as a decimal?
- R. At basketball practice, Charlie makes 52 baskets out of 80 shots. What percentage of baskets did he make?

1.75 HE
0.76 SAID
65% INK
0.8 THE
4.16 HIS
$-2\frac{39}{50}$ DIDN'T
$-11\frac{86}{125}$ ANY
$-\frac{63}{250}$ BECAUSE
$\frac{21}{25}$ ON

**Activity
2.2****Start Thinking!**

For use before Activity 2.2

The temperature on a given day is 55° . Explain to a partner how to use addition to find how the temperature would change if the temperature in one day increased 15 degrees, decreased 20 degrees, and then increased 8 degrees.

Is the temperature at the end of the day greater or less than the temperature at the beginning of the day? Explain.

**Activity
2.2****Warm Up**

For use before Activity 2.2

Add.

1. $-54 + (-23)$

2. $78 + (-24)$

3. $-23 + 65$

4. $-45 + 25$

5. $62 + (-29)$

6. $-87 + (-12)$

**Lesson
2.2****Start Thinking!**

For use before Lesson 2.2

Explain how to find $\frac{4}{5} + \left(-\frac{2}{5}\right)$.

Explain how to find $-2.6 + 5.8$.

**Lesson
2.2****Warm Up**

For use before Lesson 2.2

Add. Write fractions in simplest form.

1. $3\frac{4}{9} + \left(-\frac{2}{3}\right)$

2. $-7 + 4\frac{5}{9}$

3. $-2\frac{2}{5} + 1\frac{2}{3}$

4. $-12.3 + 5.4$

5. $1.6 + (-19.8)$

6. $5.3 + (-7.8)$

2.2 Practice A

Add. Write fractions in simplest form.

1. $\frac{5}{16} + \left(-\frac{7}{16}\right)$

2. $\frac{3}{5} + \left(-\frac{4}{15}\right)$

3. $-\frac{7}{2} + 3\frac{2}{3}$

4. $5.6 + (-1.3)$

5. $-8.2 + 5.4$

6. $7.15 + (-12.76)$

7. Describe and correct the error in finding the sum.

$$\times \quad \frac{3}{10} + \left(-\frac{1}{10}\right) = \frac{3+1}{10} = \frac{4}{10} = \frac{2}{5}$$

Evaluate the expression when $x = \frac{1}{2}$ and $y = -\frac{2}{5}$.

8. $-x + y$

9. $x + 2y$

10. $|x + y|$

11. The temperature is -12.6 degrees Celsius. The temperature goes up 7.9 degrees. What is the new temperature?

12. You finish $\frac{3}{8}$ of the project. Your friend finishes $\frac{1}{4}$ of the project. What fraction of the project is finished?

Add. Write fractions in simplest form.

13. $5 + \left(-2\frac{1}{3}\right) + \left(-3\frac{1}{6}\right)$

14. $-4\frac{1}{5} + 3\frac{2}{3} + \left(-1\frac{2}{5}\right)$

15. $-12.4 + 19.1 + (-4.3)$

16. Determine if the following statements are *always*, *sometimes*, or *never* true.

- When adding two negative rational numbers, the sum will be negative.
- When adding two rational numbers with different signs, the sum will be zero.
- When adding two positive rational numbers, the sum will be zero.
- When adding two rational numbers with different signs, the sum will be negative.

2.2 Practice B

Add. Write fractions in simplest form.

1. $\frac{2}{5} + \left(-\frac{3}{15}\right)$

2. $\frac{7}{12} + \left(-1\frac{2}{3}\right)$

3. $\frac{2}{7} + \left(-3\frac{5}{14}\right)$

4. $7.26 + (-13.43)$

5. $-18.02 + 15.68$

6. $-15.75 + (-12.76)$

7. Describe and correct the error in finding the sum.

\times	$2\frac{5}{6} + \left(-\frac{8}{15}\right) = \frac{13}{6} + \left(-\frac{8}{15}\right) = \frac{65 + (-16)}{30} = \frac{49}{30} = 1\frac{19}{30}$
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Evaluate the expression when $x = -\frac{1}{5}$ and $y = \frac{3}{4}$.

8. $x + (-y)$

9. $4x + y$

10. $-|x| + y$

11. Your banking account balance is $-\$1.56$. You deposit $\$10$. What is your new balance?

12. You mow $\frac{1}{3}$ of the lawn. Your sister mows $\frac{2}{7}$ of the lawn. What fraction of the lawn is mowed?

Add. Write fractions in simplest form.

13. $1\frac{1}{4} + \left(-4\frac{1}{5}\right) + \left(-2\frac{3}{5}\right)$

14. $-\frac{1}{3} + 2\frac{2}{9} + \left(-5\frac{2}{3}\right)$

15. $-1.5 + (14.2) + 7.3$

16. When is the sum of two rational numbers with different signs positive?

17. The table at the right shows the amount of snowfall (in inches) for three months compared to the yearly average. Is the snowfall for the three-month period greater than or less than the yearly average? Explain.

December	January	February
$1\frac{2}{3}$	$-2\frac{1}{6}$	$2\frac{5}{6}$

18. The table below shows the weekly profits of a concession stand. What must the Week 5 profit be to break even over the 5-month period?

Week 1	Week 2	Week 3	Week 4	Week 5
2.4	-1.7	5.4	-3.75	?

2.2 Enrichment and Extension

Fun with Puzzles

3, 3, 4, 9

1, 2, 3, 5

4, 6, 7, 8

2, 3, 7, 8

3, 4, 5, 6

2, 3, 8, 9

1, 2, 6, 9

1, 2, 3, 4

Choose a set of numbers from above, and fill in the boxes to make each equation true. Each set of numbers will be used once.

1. $\square \frac{\square}{\square} - 4 \frac{\square}{2} = -1 \frac{1}{10}$

2. $-\square.5\square + \square 7.\square = 35.32$

3. $\square\square.\square - 4\square 8 = -410.2$

4. $-\frac{\square}{\square} - \square \frac{\square}{2} = -3 \frac{1}{4}$

5. $-\square.8\square - \square 2.\square = -46.19$

6. $\square \frac{\square}{8} - \square \frac{3}{\square} = -1 \frac{7}{8}$

7. $-\square \frac{\square}{3} + 2 \frac{\square}{\square} = -4 \frac{5}{9}$

8. $-\square 8 + \square\square.\square = 18.4$

9. Use the numbers 1 through 8 to fill in the blanks and make the equation true. There is more than one way to do it.

$\square.\square\square - \square.\square\square = -1.\square\square$

2.2 Puzzle Time

Where Do Polar Bears Vote?

Write the letter of each answer in the box containing the exercise number.

Add. Write fractions in simplest form.

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

2. $\frac{7}{10} + \left(-\frac{3}{5}\right)$

3. $-\frac{9}{2} + \frac{5}{12}$

4. $5\frac{1}{3} + \left(-\frac{5}{9}\right)$

5. $\frac{3}{5} + \frac{8}{5}$

6. $-4 + \frac{3}{2}$

7. $3.6 + (-2.4)$

8. $-8.2 + 9.1$

9. $6.8 + (-3.2)$

10. $-4.5 + (-4.7)$

11. $5.327 + (-2.25)$

12. $14.62 + (-11.302)$

13. Sara has $4\frac{3}{4}$ yards of red fleece and $2\frac{2}{3}$ yards of blue fleece fabric. How many yards of red and blue fleece fabric does she have altogether?

14. On Saturday, you biked 7.5 miles. On Sunday, you biked 8.9 miles. How many miles did you bike altogether?

Answers

O. $2\frac{1}{6}$

T. 3.6

E. $-2\frac{1}{2}$

O. $2\frac{1}{5}$

P. 3.077

L. 16.4

T. $\frac{1}{10}$

H. -9.2

R. $7\frac{5}{12}$

A. $4\frac{7}{9}$

E. $-4\frac{1}{12}$

T. 1.2

N. 3.318

H. 0.9

4	9		2	8	3		12	1	13	7	10		11	5	14	6
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**Activity
2.3****Start Thinking!**

For use before Activity 2.3

Think of some sports where you add and subtract rational numbers. Give examples of why you would add rational numbers. Give examples that use negative rational numbers.

**Activity
2.3****Warm Up**

For use before Activity 2.3

Subtract.

1. $-45 - 25$

2. $62 - (-29)$

3. $-87 - (-12)$

4. $-32 - 43$

5. $-75 - (-87)$

6. $-12 - (-54)$

**Lesson
2.3****Start Thinking!**

For use before Lesson 2.3

Explain how to find $-\frac{4}{5} - \frac{2}{5}$.

Explain how to find $-2.6 - 5.8$.

**Lesson
2.3****Warm Up**

For use before Lesson 2.3

Subtract. Write fractions in simplest form.

1. $-7 - \frac{5}{7}$

2. $-5\frac{9}{10} - 7\frac{3}{5}$

3. $-4\frac{1}{4} - 6\frac{3}{8}$

4. $-13 - 5.9$

5. $14.6 - (-9.2)$

6. $-7.4 - 10.6$

2.3 Practice A**Subtract. Write fractions in simplest form.**

1. $\frac{3}{7} - \frac{10}{7}$

2. $\frac{7}{12} - \left(-\frac{13}{12}\right)$

3. $-\frac{1}{3} - \left(-\frac{9}{4}\right)$

4. $-3\frac{1}{2} - 1\frac{5}{6}$

5. $-12.41 - (-9.95)$

6. $2 - 8.25$

Find the distance between the two numbers on a number line.

7. $6, -4\frac{1}{4}$

8. $-3.1, -5.7$

9. $-1\frac{1}{3}, -4\frac{2}{5}$

10. Your dog's water bowl is $\frac{3}{4}$ full. After taking a drink, the water bowl is $\frac{1}{3}$ full. What fraction of the bowl did your dog drink?

Evaluate.

11. $\frac{7}{8} - \left(-2\frac{3}{4}\right) + \left(-4\frac{1}{2}\right)$

12. $5.76 - (-2.31) - 10.64$

13. Mary filled a water cooler with $6\frac{1}{2}$ gallons of water. She forgot to close the plug and $2\frac{5}{6}$ gallons leaked out.

- How many gallons of water remain in the cooler?
- She adds $1\frac{1}{4}$ gallons. How many gallons of water are now in the cooler?
- How many gallons of water must she add to the cooler to get the required $6\frac{1}{2}$ gallons?

14. Is the difference of two positive rational number always positive? Explain.

2.3 Practice B**Subtract. Write fractions in simplest form.**

1. $\frac{7}{3} - \frac{8}{15}$

2. $-\frac{7}{24} - \left(-\frac{5}{8}\right)$

3. $1\frac{5}{6} - \left(-2\frac{1}{4}\right)$

4. $-3\frac{7}{8} - 9\frac{5}{6}$

5. $-102.431 - (-59.95)$

6. $12.001 - 8.215$

Find the distance between the two numbers on a number line.

7. $-7\frac{1}{5}, -4\frac{2}{3}$

8. $-9.2, 4.5$

9. $-2, -3.7$

10. The largest orange in a bag has a circumference of $9\frac{5}{8}$ inches. The smallest orange has a circumference of $7\frac{13}{16}$ inches. Write the difference of the circumferences of the smallest orange and the largest orange.

Evaluate.

11. $\frac{5}{12} - \left(-3\frac{1}{4}\right) + \left(-6\frac{1}{2}\right) - 3$

12. $23.706 - (-82.31) - 130.641$

13. $-\frac{3}{8} - (-4.35)$

14. $-\frac{5}{18} - \left|-\frac{1}{6}\right| + \left(-\frac{7}{9}\right)$

15. Your bank account balance is \$32.00. You make the following withdrawals, in the following order: \$15.00, \$7.41, \$35.79, and \$0.53. After each withdrawal that leaves a negative balance, the bank adds a -\$32.00 bank fee to your account. What is your new balance?
16. Fill in the blanks to make the solution correct.

$$3\frac{3}{4} - \square \frac{\square}{8} = 2$$

2.3 Enrichment and Extension

Adding and Subtracting Numbers

Use the information to label the total change.

- In golf, each hole has a par, or the amount of strokes it should take to complete the hole. Find the total number of strokes above or below par the golfer shot after the first six holes golfing.

Par	5	3	5	5	5	4
# of Strokes	3	7	3	6	6	6

- Find the amount of money left in the account.

Transaction	Credit	Debit	Balance
Beginning Balance			37.07
Deposit	38.10		
Withdrawal		8.79	
Withdrawal		63.12	

- Find the total number of yards the football team gained or lost.

First down: Loss of 17 yards

Second down: Gain of 5 yards

Third down: Gain of 9 yards

Fourth down: Gain of 1 yard

Determine if the situation would result in a *positive number*, a *negative number* or *zero*. Explain.

- Your bank account has a balance of \$111.13. You write a check for \$113.10.
- You walk to your friends' house then back home. Your friend lives $\frac{7}{10}$ of a mile away.
- The temperature at the beginning of the day was 9° Fahrenheit. The temperature dropped 14° Fahrenheit.
- You cut a piece of wood into a $3\frac{1}{3}$ -foot piece and a $2\frac{2}{3}$ -foot piece. The original length of the board was 6 feet.

2.3 Puzzle Time

Where Does A Salad Dressing Get A Good Night's Sleep?

Write the letter of each answer in the box containing the exercise number.

Subtract. Write the fractions in simplest form.

1. $\frac{3}{4} - \frac{9}{4}$

2. $-3 - \frac{7}{2}$

3. $-\frac{1}{5} - \left(-\frac{5}{11}\right)$

4. $-\frac{5}{8} - \frac{2}{7}$

5. $-2\frac{2}{3} - 4\frac{1}{6}$

6. $-3\frac{1}{9} - \left(-2\frac{1}{3}\right)$

7. $-7 - 3.2$

8. $6.1 - 5.8$

9. $-4.125 - (-2.8)$

10. $-12.33 - 7.21$

11. $5.67 - (-3.142)$

12. $2.567 - 6.814$

Find the distance between the two numbers on a number line.

13. $-3\frac{1}{4}, 4\frac{1}{2}$

14. $-6.1, 8.4$

15. Your project requires a board that has a length of $5\frac{3}{16}$ inches. You found a board that has a length of $9\frac{1}{8}$ inches. How much of the board needs to be cut to use it for your project?

Answers

<p>O. $-\frac{7}{9}$</p> <p>T. 8.812</p> <p>O. -10.2</p> <p>T. 0.3</p> <p>C. $7\frac{3}{4}$</p> <p>L. $3\frac{15}{16}$</p> <p>D. 14.5</p> <p>U. $-6\frac{5}{6}$</p>	<p>A. $-6\frac{1}{2}$</p> <p>E. $-1\frac{1}{2}$</p> <p>B. -4.247</p> <p>E. $\frac{14}{55}$</p> <p>F. -1.325</p> <p>E. $-\frac{51}{56}$</p> <p>N. -19.54</p>
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6	10		2		12	4	14		7	9		15	3	11	8	5	13	1
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**Activity
2.4****Start Thinking!**

For use before Activity 2.4

Draw a diagram to represent the following football plays: gain of 2 yards, loss of 8 yards, gain of 20 yards, loss of 5 yards, and gain of 3 yards.

**Activity
2.4****Warm Up**

For use before Activity 2.4

Multiply.

1. $-12 \cdot 9$

2. $11(-10)$

3. $14 \cdot 12$

Divide.

4. $\frac{-48}{-6}$

5. $\frac{140}{-10}$

6. $\frac{-81}{3}$

**Lesson
2.4****Start Thinking!**

For use before Lesson 2.4

A company's profits for a week are as follows:
Monday: +\$32.65, Tuesday: -\$75.32,
Wednesday: -\$125.75, Thursday: +\$100.89,
and Friday: +\$65.30. Does the company show
a gain or loss at the end of the week?

**Lesson
2.4****Warm Up**

For use before Lesson 2.4

Multiply. Write fractions in simplest form.

1. $-2\frac{1}{4} \cdot \frac{4}{5}$ 2. $\left(-\frac{3}{5}\right)^3$ 3. $-1.2(-3.05)$

Divide. Write fractions in simplest form.

4. $-2\frac{4}{7} \div (-3)$ 5. $-9.6 \div 8$ 6. $6.45 \div (-30)$

2.4 Practice A

Tell whether the expression is *positive* or *negative* without evaluating.

1. $\frac{-7.5}{4.25}$ 2. $\frac{4}{9} \times \left(-\frac{6}{7}\right)$ 3. $-\frac{1}{5} \div \left(-\frac{2}{3}\right)$ 4. $-3.2 \times (-1.7)$

Divide. Write fractions in simplest form.

5. $-\frac{2}{7} \div \frac{10}{7}$ 6. $-\frac{1}{2} \div \left(-\frac{3}{4}\right)$ 7. $\frac{2}{3} \div (-14)$
 8. $-1\frac{1}{6} \div \frac{5}{3}$ 9. $-0.72 \div (-0.9)$ 10. $5.4 \div (-3.6)$

Multiply. Write fractions in simplest form.

11. $\frac{2}{5} \times \left(-\frac{10}{7}\right)$ 12. $-\frac{3}{4} \cdot \left(-\frac{10}{9}\right)$ 13. $\frac{3}{2} \left(-2\frac{2}{9}\right)$
 14. $\left(-1\frac{3}{8}\right)^2$ 15. -3.7×2.1 16. $-5.7 \cdot (-2.06)$

17. There are 15 people in a room. Each person ate $\frac{2}{3}$ of a pizza. There was no pizza remaining. How many pizzas were in the room?

18. During a drought, a river's height decreases by 0.35 inch every day. What is the change in the river's height after 7 days?

Evaluate.

19. $-3^2 + 4.6 \times (-0.1)$ 20. $-2\frac{2}{3} \div 1\frac{5}{6} + 2$
 21. $-4.31 \cdot 3.09 + (-0.98)$ 22. $-3 \times \left(-1\frac{7}{12}\right) - \left(-\frac{3}{2}\right)^2$
 23. Write two fractions, both not positive, whose product is $\frac{5}{8}$.

24. Fill in the blank to make the solution correct.

$$5.6 \times \underline{\quad ? \quad} = -19.04$$

2.4 Practice B

Divide. Write fractions in simplest form.

1. $-\frac{3}{7} \div \frac{11}{35}$

2. $-\frac{1}{9} \div \left(-\frac{13}{30}\right)$

3. $1\frac{5}{6} \div (-30)$

4. $-2\frac{4}{5} \div 10\frac{2}{3}$

5. $-0.801 \div (-0.09)$

6. $14.616 \div (-2.32)$

Multiply. Write fractions in simplest form.

7. $-\frac{2}{15} \times \left(-\frac{25}{6}\right)$

8. $-\frac{3}{14} \cdot \frac{21}{12}$

9. $1\frac{2}{3} \left(-2\frac{9}{10}\right)$

10. $-\left(3\frac{2}{5}\right)^2$

11. -2.75×3.1

12. $-1.27 \cdot (-2.02)$

13. How many three-quarter pound burgers can be made with twelve pounds of hamburger?

14. The table shows the changes in your times (in seconds) at the new skateboard ramp. What is your mean change?

Trial	1	2	3	4	5
Change	2.2	-1.4	0.6	-2.3	-1.7

Evaluate.

15. $-0.2^3 - 4.15(-0.06)$

16. $5 - 3\frac{9}{10} \div 2\frac{3}{5}$

17. $-14.01 \cdot 2.39 + |-4.89|$

18. $2\frac{1}{3} \times \left(-4\frac{5}{7}\right) - \left(-\frac{3}{5}\right)^2$

19. A gallon of gasoline costs \$2.96. Your car has a 25-gallon gas tank and can travel 28.8 miles on each gallon of gasoline.

a. Find the cost of filling your gas tank if it is already $\frac{3}{8}$ full.

b. You take a trip of length $705\frac{3}{5}$ miles. How much money do you spend on gasoline?

2.4 Enrichment and Extension

The Zweezam Factory

The Zweezam Factory manufactures Zweenubs, Zweedulls, and Zweebuds.

The table shows the costs and income for each type of item.

	Zweenubs	Zweedulls	Zweebuds
Cost per item manufactured	\$2.53	\$6.58	\$8.72
Income per item sold	\$4.50	\$8.89	\$9.99

Answer the following questions about this week at the Zweezam Factory.

1. This week the Zweezam Factory manufactured 46 items altogether including 24 Zweenubs. They manufactured two-thirds as many Zweedulls as Zweenubs and one-fourth as many Zweebuds as Zweenubs. How many of each type did the factory manufacture?
2. What is the factory's total manufacturing cost?
3. Also this week, the Zweezam Factory sold 32 parts altogether including 10 Zweedulls. They sold half as many Zweedulls as Zweenubs and one-fifth as many Zweebuds as Zweedulls. How many of each type did the factory sell?
4. What is the factory's total income?
5. What was the Zweezam Factory's profit this week?
(*Hint*: profit = total income – total cost)
6. If the Zweezam Factory continues to manufacture and sell the same number of items for four more weeks, what will be the total profit for five weeks?
7. The Zweezam Factory plans to manufacture fewer items next week. They will manufacture 40 items altogether: two-fifths as many Zweedulls as Zweenubs and one-half as many Zweebuds as Zweedulls. If the Zweezam Factory manufactured 5 Zweebuds, how many of each type will the Zweezam Factory manufacture?
8. They already have pre-orders for next week's batch: 12 Zweenubs, 5 Zweedulls, and 1 Zweebud. Each week the parts must be thrown out, and only the new batch can be sold. So, how much more income do they have to make in order to break even (i.e. have a profit of zero) next week? What is the most profit they could earn next week?
9. If they sold Zweenubs only next week, could they make enough income to break even? Explain your reasoning.

2.4 Puzzle Time

When Is A Baby Like A Basketball Player?

Write the letter of each answer in the box containing the exercise number.

Multiply. Write fractions in simplest form.

1. $-\frac{4}{5} \cdot \left(-\frac{5}{7}\right)$ 2. $2\frac{2}{3} \cdot \left(-4\frac{1}{4}\right)$

3. $\left(-\frac{3}{4}\right)^3$ 4. $0.8 \times (-2.1)$

5. $-7.5 \times (-0.3)$ 6. $(-0.8)^3$

Divide. Write fractions in simplest form.

7. $\frac{5}{8} \div \left(-\frac{1}{4}\right)$ 8. $-1\frac{1}{6} \div \frac{2}{9}$

9. $-6\frac{2}{5} \div \left(-2\frac{2}{7}\right)$ 10. $0.3 \div (-1.5)$

11. $-5.415 \div (-2.85)$ 12. $-16.29 \div 3.62$

13. What is the square foot area of a room with a length of $10\frac{3}{4}$ feet and a width of $8\frac{1}{2}$ feet?

14. For a fundraiser, the seventh grade class sells 45 submarine sandwiches. They collect a total of \$150.75. What is the cost per sub?

Answers	
R. 2.25	E. $-\frac{27}{64}$
S. $-2\frac{1}{2}$	D. $91\frac{3}{8}$
H. -0.512	E. $-5\frac{1}{4}$
B. 3.35	I. -0.2
L. -4.5	W. 1.9
E. $\frac{4}{7}$	B. -1.68
N. $2\frac{4}{5}$	H. $-11\frac{1}{3}$

11	6	3	9		2	8		13	5	10	14	4	12	1	7
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Chapter 2

Technology Connection

For use after Section 2.3

Adding and Subtracting Rational Numbers

In this activity, you will use a scientific calculator to add and subtract rational numbers. To enter a fraction on a scientific calculator, use the $\boxed{\text{a b/c}}$ key.

To convert a mixed number to an improper fraction, use the $\boxed{\text{d/c}}$ key.

EXAMPLE Use a scientific calculator to find the sum or difference.

a. $\frac{1}{4} + \frac{2}{3}$

b. $-\frac{21}{8} - \frac{17}{12}$

c. $6\frac{3}{10} + \left(-2\frac{5}{8}\right)$

SOLUTION

Enter the following keystrokes:

a. 1 $\boxed{\text{a b/c}}$ 4 $\boxed{+}$ 2 $\boxed{\text{a b/c}}$ 3 $\boxed{=}$

The answer is $\frac{11}{12}$.

b. 21 $\boxed{+/-}$ $\boxed{\text{a b/c}}$ 8 $\boxed{-}$ 17 $\boxed{\text{a b/c}}$ 12 $\boxed{=}$

The answer is $-4\frac{1}{24}$.

c. 6 $\boxed{\text{a b/c}}$ 3 $\boxed{\text{a b/c}}$ 10 $\boxed{+}$ 2 $\boxed{+/-}$ $\boxed{\text{a b/c}}$ 5 $\boxed{\text{a b/c}}$ 8 $\boxed{=}$

The answer is $3\frac{27}{40}$.

Notice in parts (b) and (c) that the final display shows a mixed number. To convert the mixed number in part (b) to an improper fraction, press $\boxed{2\text{nd}}$ or

$\boxed{\text{Shift}}$ then $\boxed{\text{d/c}}$. The answer as an improper fraction is $-\frac{97}{24}$.

Use a scientific calculator to find the sum or difference. Write your answer as a mixed number and an improper fraction, if possible.

1. $\frac{1}{5} + \frac{7}{10}$

2. $\frac{11}{4} - \frac{3}{8}$

3. $-\frac{4}{9} - \left(-\frac{1}{12}\right)$

4. $\frac{14}{25} + \frac{38}{15}$

5. $3\frac{5}{16} + \left(-2\frac{1}{2}\right)$

6. $-5\frac{1}{4} + 6\frac{5}{9}$