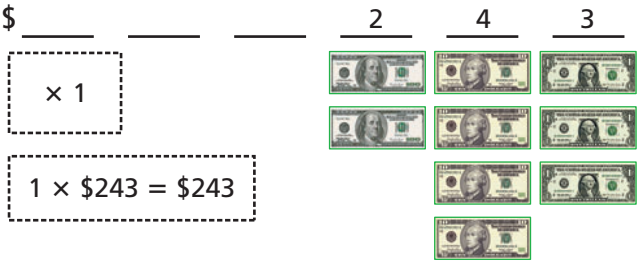
4–1 Class Activity

Name Date

▶ Shifts With Whole Numbers

Jordan earns $243 a week. The money is shown at the right. Answer the questions about how much he will earn over time.

Jordan's Weekly Earnings



1. After 10 weeks, how much will Jordan have earned?

_____

2. What happens to each $1-bill when it is multiplied by 10?

_____

3. What happens to each other bill when it is multiplied by 10?

_____

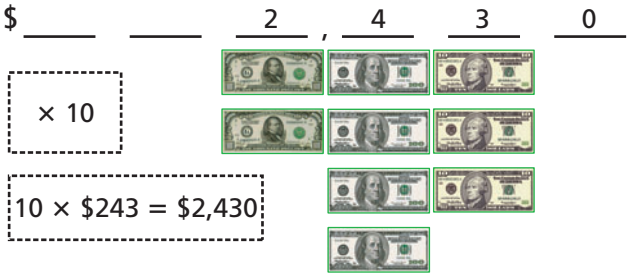
4. When you multiply by 10, does each digit shift to the right or left?

_____

5. How many places does each digit shift?

_____

After 10 Weeks



Name _____ Date _____

6. After 100 weeks, how much will Jordan have earned?

_____

7. What happens to each $1-bill when it is multiplied by 100?

_____

8. What happens to each digit when it is multiplied by 100?

_____

9. When you multiply by 100, does each digit shift to the right or left?

_____

10. How many places does each digit shift?

_____

After 100 Weeks

$ _____ 2 4 , 3 0 0

× 100

10 × 10 × $243 = $24,300

11. After 1,000 weeks, how much will Jordan have earned?

_____

12. What happens to each $1-bill when it is multiplied by 1,000?

_____

13. What happens to each digit when it is multiplied by 1,000?

_____

14. When you multiply by 1,000, does each digit shift to the right or left?

_____

15. How many places does each digit shift?

_____

After 1,000 Weeks

$ 2 4 3 , 0 0 0

× 1000

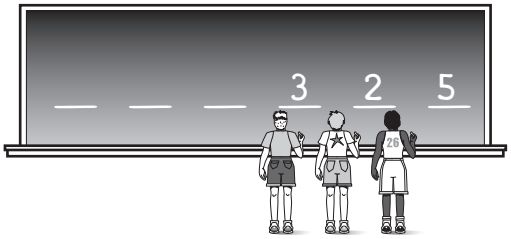
10 × 10 × 10 × $243 = $243,000

4–1 Class Activity

Name _____ Date _____

▶ See the Shift in Motion

Isabel earns $325 a week. Three students can show how the digits shift at the board when we multiply her earnings.



Complete each exercise.

16. Suppose Isabel works for 10 weeks. Find her earnings.

___ ___ ___ $ 3 2 5 × 10 $ ___ ___ 3 , 2 5 0

$325 shifts ___ place(s) to the ___. It gets 10 times as great.

17. Suppose Isabel works for 100 weeks. Find her earnings.

___ ___ ___ $ 3 2 5 × 100 $ ___ 3 2 , 5 0 0

$325 shifts ___ places to the ___. It gets 100 times as great.

18. Suppose Isabel works for 1,000 weeks. Find her earnings.

___ ___ ___ $ 3 2 5 × 1,000 $ 3 2 5 , 0 0 0

$325 shifts _____ places to the ___. It gets 1,000 times as great.

Complete each exercise.

19. 567 × 10 = _____

20. 38 × 1,000 = _____

21. 912 × 100 = _____

22. 700 × 10 = _____

23. The Skyway Express train travels about 800 miles a day. How far does it travel in 10 days?

_____

24. If there are 30 days in April, about how far will the train travel during the month of April?

_____

4–1 Class Activity

Name _____ Date _____

▶ Shifts With Decimal Amounts

It costs $0.412 (41 and 2/10 cents) for a factory to make a Red Phantom marble. The money is shown here.

Cost of a Red Phantom Marble

$ ____ ____ ____ . 4 1 2

× 1

1 × $0.412 = $0.412

Answer each question about the cost of making different numbers of Red Phantom marbles.

25. How much does it cost to make 10 Red Phantom Marbles?

_____

26. What happens to each coin when it is multiplied by 10?

_____

27. What happens to each digit?

_____

28. When you multiply by 10, does each digit shift to the right or left?

_____

29. How many places does each digit shift?

_____

10 Red Phantom Marbles

$ ____ ____ 4 . 1 2 ____

× 10

10 × $0.412 = $4.12

Name _____ Date _____

30. How much does it cost to make 100 Red Phantom Marbles?

_____

31. What happens to each coin when you multiply by 100?

_____

32. What happens to each digit?

_____

33. When you multiply by 100, does each digit shift to the right or left?

_____

34. How many places does each digit shift?

_____

35. How much does it cost to make 1,000 Red Phantom Marbles?

_____

36. What happens to each coin when you multiply by 1,000?

_____

37. What happens to each digit?

_____

38. When you multiply by 1,000, does each digit shift to the right or left?

_____

39. How many places does each digit shift?

_____

100 Red Phantom Marbles

$ ____ 4 1 . 2 0 ____

× 100

100 × $0.412 = $41.20

1,000 Red Phantom Marbles

$ 4 1 2 . 0 0 ____

× 1,000

1,000 × $0.412 = $412.00

4–1 Class Activity

Name _____ Date _____

▶ Patterns in Multiplying With Zeros

Discuss patterns you see across each row and down each column. Then state the Big Idea for multiplying numbers with zeros.

×	3	30	300	3,000
2	**a.** 2 × 3 = 6	**b.** 2 × 30 = 2 × 3 × 10 = 6 × 10 = 60	**c.** 2 × 300 = 2 × 3 × 100 = 6 × 100 = 600	**d.** 2 × 3,000 = 2 × 3 × 1,000 = 6 × 1,000 = 6,000
20	**e.** 20 × 3 = 2 × 10 × 3 = 6 × 10 = 60	**f.** 20 × 30 = 2 × 10 × 3 × 10 = 6 × 100 = 600	**g.** 20 × 300 = 2 × 10 × 3 × 100 = 6 × 1,000 = 6,000	**h.** 20 × 3,000 = 2 × 10 × 3 × 1,000 = 6 × 10,000 = 60,000
200	**i.** 200 × 3 = 2 × 100 × 3 = 6 x 100 = 600	**j.** 200 × 30 = 2 × 100 × 3 × 10 = 6 × 1,000 = 6,000	**k.** 200 × 300 = 2 × 100 × 3 × 100 = 6 × 10,000 = 60,000	**l.** 200 × 3,000 = 2 × 100 × 3 × 1,000 = 6 × 100,000 = 600,000
2,000	**m.** 2,000 × 3 = 2 × 1,000 × 3 = 6 × 1,000 = 6,000	**n.** 2,000 × 30 = 2 × 1,000 × 3 × 10 = 6 × 10,000 = 60,000	**o.** 2,000 × 300 = 2 × 1,000 × 3 × 100 = 6 × 100,000 = 600,000	**p.** 2,000 × 3,000 = 2 × 1,000 × 3 × 1,000 = 6 × 1,000,000 = 6,000,000

40. Big Idea: _____

Solve.

41. 60 × 3

42. 60 × 30

43. 600 × 30

44. 600 × 300

45. 6,000 × 30

Dear Family,

Your child worked with multiplication and division problems in Unit 1. Unit 4 of *Math Expressions* guides students as they deepen and extend their mastery of these operations. The main goal of this unit is to enhance skills in multiplying and dividing with whole numbers and decimal numbers. Some additional goals are:

- to solve real-world application problems,
- to use patterns as an aid in calculating,
- to use estimation to check the reasonableness of answers,
- to understand how to convert fractions to decimals, and
- to interpret remainders.

Your child will learn and practice techniques such as Rectangle Sections, Expanded Notation, and Shift Patterns to gain speed and accuracy in multi-digit and decimal multiplication and division. Money examples will be used in multiplication and division with decimals.

Your child will learn to round and estimate, and then adjust the estimated number. Remainders will be interpreted in real-world contexts, and expressed as fractions or decimals. Students will divide by decimal numbers, and learn to distinguish between multiplication and division when there are decimal numbers.

Throughout Unit 4, your child will solve real-world application problems that require multi-digit multiplication and division. Your child may need more work with the multiplication table, so please support practice with the Target and Multiplication Tables and Division Cards.

If you have any questions, please call or write to me.

Sincerely,
Your Child's Teacher

Estimada familia:

Su niño ya ha estudiado problemas de multiplicación y división en años anteriores. La Unidad 4 de *Math Expressions* guía a los estudiantes mientras profundizan y amplían su dominio de estas operaciones. El objetivo principal de la unidad es reforzar las destrezas de multiplicación y división con números enteros y decimales. Algunos objetivos adicionales son:

- resolver problemas con aplicaciones a la vida diaria,
- usar patrones de ayuda para hacer cálculos,
- usar la estimación para comprobar si las respuestas son razonables,
- comprender cómo se convierten las fracciones a decimales, e
- interpretar los residuos.

Su niño aprenderá y practicará técnicas como secciones de rectángulos, notación extendida y patrones de desplazamiento para poder hacer las multiplicaciones y divisiones de números de varíos dígitos y decímales con mayor rapidez y exactitud. En las multiplicaciones y divisiones con decimales se usarán ejemplos de dinero.

Su niño aprenderá a redondear y estimar, y luego a ajustar el número estimado. Los residuos se interpretarán dentro de contextos de la vida diaria y se expresarán como fracciones o decimales. Los estudiantes dividirán por números decimales y aprenderán a distinguir entre la multiplicación y la división con números decimales.

En de la Unidad 4 su niño resolverá problemas con aplicaciones a la vida diaria que requieren multiplicación y división de números de varios dígitos. Tal vez su níño necesite más práctica con la tabla de multiplicar. Por favor apoye a su níño con la práctica de las tablas de multiplicar y las tarjetas de divisíones.

Si tiene alguna duda o comentario, por favor comuníquese conmigo.

Atentamente,
El maestro su niño

4–2 Class Activity

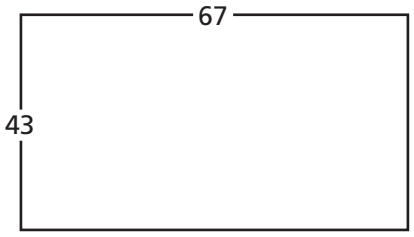
Name Date

Vocabulary

Rectangle Sections
partial products

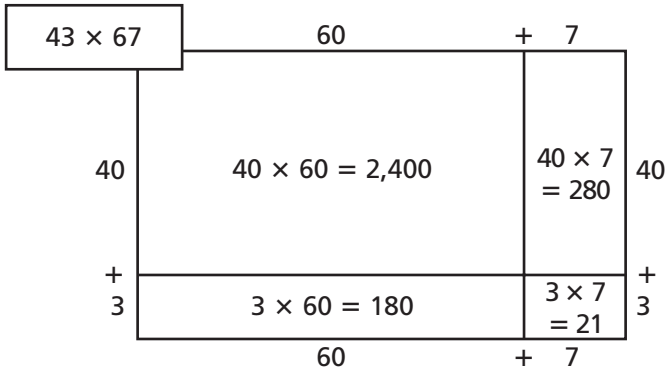
▶ Solve With Rectangle Sections

Think about finding the area of this rectangle (*Area* = *length* × *width*). It would be difficult to find 43 × 67 in one step. But if you broke the rectangle into smaller **Rectangle Sections**, then you could do it.

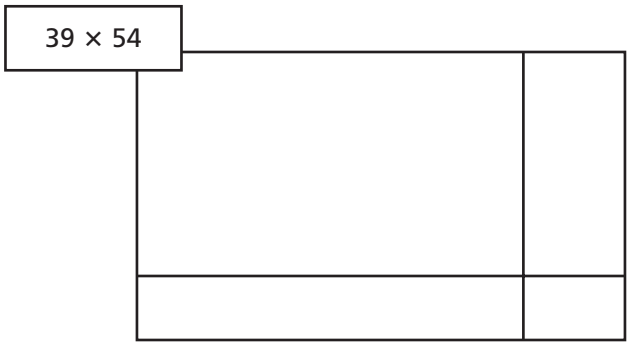


When you multiply larger numbers, you often need to break the problem into smaller parts. The products of these smaller parts are called **partial products**. After you find all the partial products, you can add them together.

1. Explain how Rectangle Sections are used to solve the problem below.



2. Use Rectangle Sections to solve the multiplication problem below.



4–2 Class Activity

Name _____ Date _____

Vocabulary
Expanded Notation

▶ Solve With Expanded Notation

Look at the **Expanded Notation** method of solving below. Diagrams A and B both show the Expanded Notation method. Diagram B only shows the results of the steps.

3. How is this method like the Rectangle Sections? How is it different?

_____

_____

43 × 67

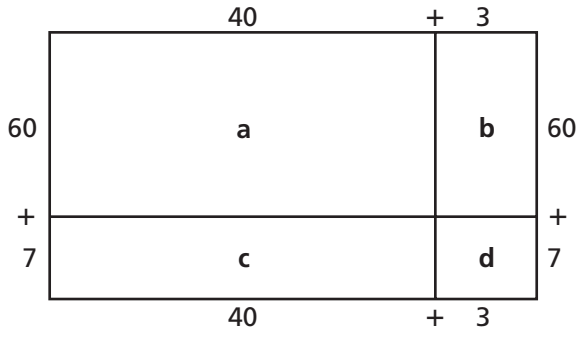
A

$$\begin{array}{r} 43 = 40 + 3 \\ \times\ 67 = 60 + 7 \\ \hline 40 \times 60 = 2{,}400 \\ 3 \times 60 = 180 \\ 7 \times 40 = 280 \\ 7 \times 3 = 21 \\ \hline 2{,}881 \end{array}$$

B

$$\begin{array}{r} 43 \\ \times\ 67 \\ \hline 2{,}400 \\ 180 \\ 280 \\ 21 \\ \hline 2{,}881 \end{array}$$

4. This rectangle shows the same problem. Can you relate the rectangle sections (a, b, c, d) to the 4 partial products shown in the Expanded Notation method above? Draw a line connecting each rectangle section to the partial product it shows.



Solve. Use any method you like.

Show your work.

5. There are 32 cattle cars on today's train to Detroit. Each car holds 28 cows. How many cows are on the train?

_____

6. Maria jogs 21 miles every week. If there are 52 weeks in a year, how many miles does Maria jog in a year?

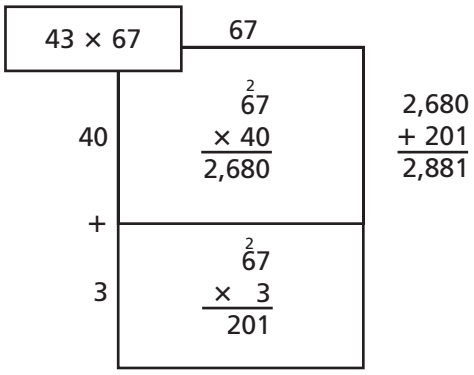
_____

Name Date

Vocabulary
Rectangle Rows

▶ Methods for Two-Digit Multiplication

Look at the multiplication problem shown here. It is solved with another rectangle method called **Rectangle Rows**.



1. Explain the steps of the Rectangle Rows method.

2. How is the Rectangle Rows method alike and different from the Rectangle Sections method you used yesterday?

Use the Rectangle Rows method to solve each problem.

3. 28 × 34

4. 59 × 73

4–3 Class Activity

Name _____ Date _____

Vocabulary

Short Cut

Here, 43 × 67 is solved with a method we call the **Short Cut**.

Step 1	Step 2	Step 3	Step 4	Step 5
$\overset{2}{67}$ × 43 1	$\overset{2}{67}$ × 43 201	$\overset{2}{67}$ × 43 201 0	$\overset{2}{\overset{2}{67}}$ × 43 201 2,680	$\overset{2}{\overset{2}{67}}$ × 43 201 2,680 2,881

5. Explain the different steps of this method.

6. Why do we begin Step 3 by putting a zero in the ones place?

7. How is the Short Cut method like the Rectangle Rows method? How is it different?

4–3 Class Activity

Name Date

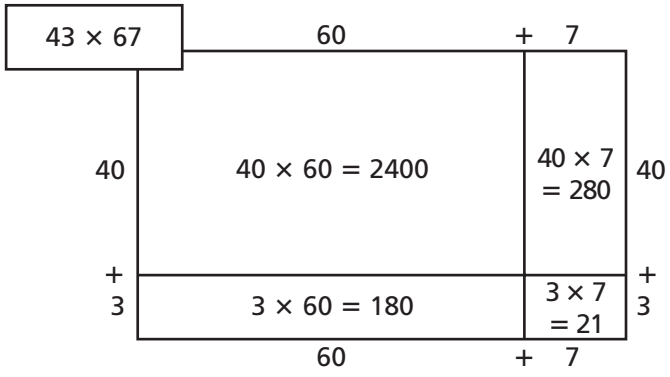
▶ Discuss Multiplication Methods

Below are the four multiplication methods your class has tried. Discuss these questions about the methods.

8. How do the 4 partial products in the two top methods relate to the 2 partial products in the two bottom methods?

9. For the Short Cut method, one way starts with the tens and one way starts with the ones. Could we do the other methods by starting with the ones? Explain why or why not.

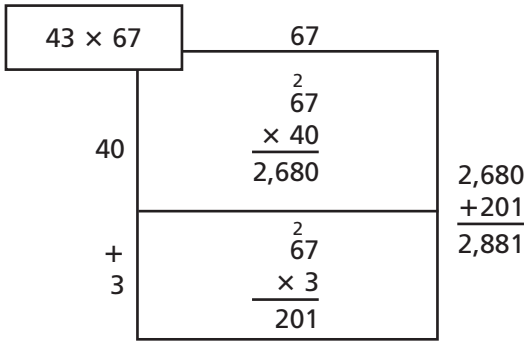
Rectangle Sections



Expanded Notation

$$
\begin{aligned}
67 &= 60 + 7 \\
43 &= 40 + 3 \\
40 \times 60 &= 2{,}400 \\
40 \times 7 &= 280 \\
3 \times 60 &= 180 \\
3 \times 7 &= 21 \\
&\ {}^{1} \\
&2{,}881
\end{aligned}
$$

Rectangle Rows



Short Cut
Multiply by Tens First

$$
\begin{array}{r}
{}^{2}\ {}^{2} \\
67 \\
\times\ 43 \\
\hline
2{,}680 \\
201 \\
\hline
2{,}881
\end{array}
$$

Short Cut
Multiply by Ones First

$$
\begin{array}{r}
{}^{2}\ {}^{2} \\
67 \\
\times\ 43 \\
\hline
201 \\
2{,}680 \\
\hline
2{,}881
\end{array}
$$

Solve.

10. $\begin{array}{r} 94 \\ \times\ 36 \\ \hline \end{array}$

11. $\begin{array}{r} 73 \\ \times\ 45 \\ \hline \end{array}$

12. $\begin{array}{r} 69 \\ \times\ 82 \\ \hline \end{array}$

13. $\begin{array}{r} 58 \\ \times\ 70 \\ \hline \end{array}$

Name _____ Date _____

▶ Work Backward

Some problems are easiest to solve if you work backward.

Suppose you want to solve this problem: Julian has 5 times as many baseball cards as Carla. Carla has 8 times as many cards as Pete. Pete has 6 cards. How many cards does Julian have?

Answer these questions to solve the problem by working backward.

1. How many cards does Pete have?

_____

2. Carla has 8 times as many cards as Pete. How many cards does Carla have?

_____

3. Julian has 5 times as many cards as Carla. How many cards does Julian have?

_____

4. Look back and check. Write the steps of your check.

_____

_____

Work backward to solve each problem.

5. Barbara spent half of her money at the mall. Then she spent half of what was left at the video store. She had $37 when she came home. How much money did Barbara have when she started at the mall?

_____

6. Paul gave Brenda one third of his pretzels. Brenda shared her pretzels equally with Edwin. Edwin had 40 pretzels. How many pretzels did Paul have before he gave Brenda the pretzels?

_____

7. A number is multiplied by 12 and then that result is doubled. The final result is 288. What is the number?

_____

8. You multiply a number by 10 and then divide the result by 5. The final result is 90. Find the starting number.

_____

Name Date

▶ Multiply Three-Digit Numbers

1. Below are the four multiplication methods your class has tried. Discuss advantages and disadvantages of each method. Which methods seem better for these problems with larger numbers? Why?

Rectangle Sections

243 × 967	900	+	60	+	7	
200	180,000		12,000		1,400	200
+						+
40	36,000		2,400		280	40
+						+
3	2,700		180		21	3
	900	+	60	+	7	

$$\begin{array}{r} {\scriptstyle 1\,1\,1\,1} \\ 180{,}000 \\ 12{,}000 \\ 1{,}400 \\ \hline 36{,}000 \\ 2{,}400 \\ 280 \\ \hline 2{,}700 \\ 180 \\ 21 \\ \hline 234{,}981 \end{array}$$

Expanded Notation

$$\begin{array}{r} 967 = 900 + 60 + 7 \\ \times\ 243 = 200 + 40 + 3 \\ \hline \end{array}$$

$$\begin{array}{rl} & {\scriptstyle 1\,1\,1\,1} \\ 200 \times 900 = & 180{,}000 \\ 200 \times 60 = & 12{,}000 \\ 200 \times 7 = & 1{,}400 \\ & \\ 40 \times 900 = & 36{,}000 \\ 40 \times 60 = & 2{,}400 \\ 40 \times 7 = & 280 \\ & \\ 3 \times 900 = & 2{,}700 \\ 3 \times 60 = & 180 \\ 3 \times 7 = & 21 \\ \hline & 234{,}981 \end{array}$$

Rectangle Rows

243 × 967	967
200	$\begin{array}{r} {\scriptstyle 1\,1} \\ 967 \\ \times\ 200 \\ \hline 193{,}400 \end{array}$
+	
40	$\begin{array}{r} {\scriptstyle 2\,2} \\ 967 \\ \times\ 40 \\ \hline 38{,}680 \end{array}$
+	
3	$\begin{array}{r} {\scriptstyle 2\,2} \\ 967 \\ \times\ 3 \\ \hline 2{,}901 \end{array}$

$$\begin{array}{r} {\scriptstyle 1\,1\,1} \\ 193{,}400 \\ 38{,}680 \\ +\ 2{,}901 \\ \hline 234{,}981 \end{array}$$

Short Cut

Multiply by Hundreds First

$$\begin{array}{r} {\scriptstyle 2\,2} \\ {\scriptstyle 2\,2} \\ {\scriptstyle 1\,1} \\ 967 \\ \times\ 243 \\ \hline {\scriptstyle 1\,1\,1} \\ 193{,}400 \\ 38{,}680 \\ 2{,}901 \\ \hline 234{,}981 \end{array}$$

or

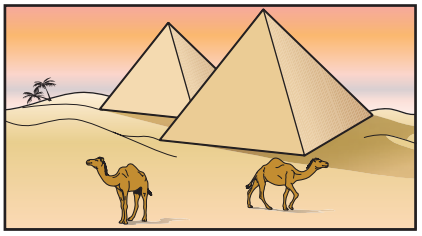
Multiply by Ones First

$$\begin{array}{r} {\scriptstyle 1\,1} \\ {\scriptstyle 2\,2} \\ {\scriptstyle 2\,2} \\ 967 \\ \times\ 243 \\ \hline {\scriptstyle 1\,1\,1} \\ 2{,}901 \\ 38{,}680 \\ 193{,}400 \\ \hline 234{,}981 \end{array}$$

4–4 Class Activity

Name Date

▶ Word Problems With Large Numbers



Two scientists went to Egypt to measure some of the ancient monuments there. Help them figure out the information they need to know.

Solve.

2. The Sphinx is a huge statue with the body of a lion and the head of a human. It was built thousands of years ago and still sits in the middle of the desert. The Sphinx is about 80 yards long. If there are 3 feet in a yard, how long is the Sphinx in feet?

_____

3. The base of the Great Pyramid is a square about 150 feet on each side. How many square feet of ground does it cover?

_____

4. Some of the blocks used to build the pyramids weigh up to 14 tons. If a ton is equal to 2,000 pounds, how much does one of these large blocks weigh in pounds?

_____

5. If we include the end zones, a football field is 360 feet by 160 feet. What is the area of a football field in square feet?

_____

6. The largest Egyptian pyramid covers an area as large as 10 football fields. What area is covered by the largest Egyptian pyramid?

_____

7. The scientists stayed in Egypt for a year and traveled about 145 miles each day. If there are 365 days in a year, how far did they travel that year?

_____

Name _____ Date _____

▶ Patterns With Fives

1. Write an answer to the Puzzled Penquin.

Dear Math Students:

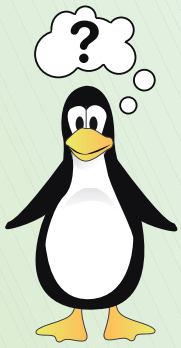
I know that when you multiply two numbers together, the product has the same number of zeros as the two factors. For example, 60 × 20 is 1,200. There are two zeros in the factors (60 and 20) and two zeros in the product (1,200).

I am confused about one thing. I know that 50 × 2 is 100, and I am quite sure that 50 × 4 is 200. In these two problems, there is only one zero in the factors, but there are **two** zeros in the product. The pattern I learned does not seem to be true in these cases.

Did I make a mistake somewhere?

Thank you.

Puzzled Penguin



2. Find each product to complete the chart below. One factor in each problem contains a 5. Discuss the patterns you see for the number of zeros in each product. How does the number of zeros in the product relate to the number of zeros in the factors?

5 × 20	=	5 × 2 × 10	=	10 × 10	=		
50 × 40	=	5 × 10 × 4 × 10	=	20 × 100	=		
50 × 600	=	5 × 10 × 6 × 100	=	30 × 1,000	=		
500 × 800	=	5 × 100 × 8 × 100	=	40 × 10,000	=		

Name _____ Date _____

3. Find each product to complete the chart below. Again, one factor in each problem contains a 5. How does the number of zeros in the product relate to the number of zeros in the factors?

_____

_____

5 × 30	=	5 × 3 × 10	=	15 × 10	=	
50 × 50	=	5 × 10 × 5 × 10	=	25 × 100	=	
50 × 700	=	5 × 10 × 7 × 100	=	35 × 1,000	=	
500 × 900	=	5 × 100 × 9 × 100	=	45 × 10,000	=	

4. Explain why the product sometimes has an "extra" zero.

_____

_____

▶ Solve Fives-Pattern Problems

Decide how many zeros there will be. Then solve.

5. 80 × 5

6. 70 × 5

7. 90 × 50

8. 60 × 50

Solve.

9. Ernesto and his sister Dora are playing a computer game. Ernesto has earned 236 points so far. His sister has earned 50 times as many points. How many points has Dora earned?

_____

10. Mount Whitney is the tallest mountain in the lower 48 states of the United States. It is about 14,500 feet tall. Mount Everest is the tallest mountain in the world. It is twice as tall as Mount Whitney. About how tall is Mount Everest?

_____

Name _____ Date _____

▶ Computation Practice

Multiply. Use a separate sheet of paper or work on your MathBoard.

1. 35 × 90	**2.** 74 × 40	**3.** 67 × 41	**4.** 18 × 72
5. 82 × 76	**6.** 96 × 43	**7.** 153 × 79	**8.** 216 × 74
9. 653 × 89	**10.** 584 × 75	**11.** 213 × 479	**12.** 406 × 124

▶ Practice With Word Problems

Solve.

Show your work.

13. The planet Mercury has a diameter of 3,100 miles. Neptune's diameter is 10 times Mercury's diameter. What is Neptune's diameter?

_____

14. A movie theater has 16 rows of seats, with 36 seats in each row. What is the total number of seats in the theater?

_____

15. A large package of toothpicks contains 425 toothpicks. If Kerry buys 24 packages, how many toothpicks will she have?

_____

16. Paolo's car can travel 285 miles on each tank of gasoline. How many miles can the car travel on 20 tanks of gasoline?

_____

17. Farmer Ruben's rectangular wheat field is 789 meters by 854 meters. What is the area of this wheat field?

_____

4–6 Going Further

Name _____ Date _____

Vocabulary

estimate
overestimate

▶ Estimate Products

You can **estimate** to check if an answer is reasonable or to see when an exact answer is not needed. You estimate to find about how many or about how much.

Carrie wants to estimate 411 × 87. She rounds each factor to its greatest place and then multiplies.
411 × 87 is about 36,000.

411 × 87
↓ ↓
400 × 90 = 36,000

Estimate each product.

1. 68 × 41 _____ 2. 62 × 619 _____ 3. 57 × 829 _____ 4. 309 × 513 _____

Sometimes you need to **overestimate** to be sure you have enough.

Mr. Poy is planning a trip for 64 students. The cost will be $19 per student. To be sure he allows enough money in the budget, he overestimates. He rounds each factor up and then multiplies. By overestimating, he knows that $1,400 is more than he needs.

64 × 19
↓ ↓
70 × 20 = 1,400

Solve. Decide whether to estimate, overestimate, or find the exact answer.

5. There are 21 crates of oranges. Each crate weighs 195 pounds. About how many pounds of oranges are there?

_____

6. Akule's family uses an average of 597 gallons of water per day. About how many gallons will they use in one month?

_____

7. Ms. Long has 12,000 cans of juice. There are 543 students, and there are 18 school days in May. Is there enough for every student to get one can of juice each school day in May? Explain.

_____

_____

8. Erin is making programs for a play. Each program has 9 sheets of paper. Last year, 445 programs were used. Erin wants to overestimate to be sure she has enough paper. How many sheets of paper should she order?

_____

4–7 Class Activity

Name Date

▶ Decimals in Money Situations

The Ruiz children had a yard sale. They sold some old toys. They made a table to show how many toys they sold and how much money they earned.

jump ropes	9 cents	3 × 9 cents = 27 cents	3 × \$0.09 = \$0.27
marbles	2 cents	4 × 2 cents = 8 cents	4 × \$0.02 = \$0.08
toy cars	12 cents	6 × 12 cents = 72 cents	6 × \$0.12 = \$0.72
puzzles	30 cents	5 × 30 cents = 150 cents	5 × \$0.30 = \$1.50

1. How did they know the number of decimal places in each product?

_____

_____

2. How much money did they earn?

_____

Mia saves the change from her lunch money each day. She gets \$0.34 in change, and she has been saving it for 26 days. Mia used the steps below to find how much money she has saved so far.

\$0.34 = \$0.30 + \$0.04
× 26 = 20 + 6

Step 1	Multiply by the number in the ones place (6).	6 × \$0.04 = 6 × 4 cents = 24 cents =	\$0.24
		6 × \$0.30 = 6 × 30 cents = 180 cents =	\$1.80
Step 2	Multiply by the number in the tens place (2 tens = 20).	20 × \$0.04 = 20 × 4 cents = 80 cents =	\$0.80
		20 × \$0.30 = 20 × 30 cents = 60 dimes =	\$6.00
Step 3	Add the partial products.		\$8.84

3. How many decimal places are there in the decimal factor (0.34)? How many decimal places are there in the answer?

_____

4–7 Class Activity

Name Date

A bead factory spends $0.346 to make each crystal bead. The steps below show how Antonio finds the total amount the factory spends to make 222 crystal beads.

$$\begin{array}{r} \$0.346 \\ \times \quad 222 \\ \hline \end{array}$$

Step 1	Multiply by the number in the ones place.	2 × $0.346 = $0.692
Step 2	Multiply by the number in the tens place. (2 tens = 20; 0.692 shifts 1 place left.)	20 × $0.346 = $6.920
Step 3	Multiply by the number in the hundreds place. (2 hundreds = 200; 0.692 shifts 2 places left.)	200 × $0.346 = $69.200
Step 4	Add the partial products.	$76.812

4. How many decimal places are there in the decimal factor (0.346)? How many decimal places are there in the answer?

5. Describe the relationship between the number of decimal places you have seen in a decimal product and the number of decimal places in its decimal factor.

▶ Decimals in Other Situations

6. The owners of the Seven Seas Spice Company want to sell twice as much spice in the future as they do now. The table shows how much spice they sell in a week now and how much they want to sell in the future. Explain how to get the answers by adding.

Cloves	0.3 ton	2 × 0.3 ton = 0.6 ton	because 0.3 + 0.3 = 0.6
Cinnamon	0.004 ton	2 × 0.004 ton = 0.008 ton	because 0.004 + _____ = _____
Ginger	0.007 ton	2 × 0.007 ton = 0.014 ton	because _____ + _____ = _____
Pepper	0.6 ton	2 × 0.6 ton = 1.2 tons	because _____ + _____ = _____

7. Look at the number of decimal places in each decimal factor and the number of decimal places in each product. What pattern do you see?

8. Is this the same pattern you saw in problems 1–4?

Name Date

▶ Multiply With Decimals

Look at the patterns you have developed in exercises 1–8.

9. State the Big Idea for multiplying a whole number times a decimal number.

Find each product.

10. 0.8×6

11. 0.3×40

12. 0.005×9

13. 0.14×32

14. 0.43×64

Solve.

15. Jesse bought 3 aquariums. Each holds 8.75 gallons of water. How many gallons of water will they hold altogether?

16. Jesse wants to buy 24 angelfish. Each angelfish costs $2.35. What will be the total cost of the angelfish?

17. There are three goldfish in one of Jesse's aquariums. Gus is the smallest. He weighs only 0.98 ounce. Ella weighs 3 times as much as Gus. What is Ella's weight?

18. Otto weighs 7 times as much as Gus. What is Otto's weight?

Name _____ Date _____

▶ Zero Patterns in Decimal Places

You have seen patterns in multiplying by multiples of 10. You have seen patterns in multiplying by decimals. You can use these two patterns together. The table below shows how you can multiply decimals by whole numbers, using:

- ones, tens, and hundreds
- tenths, hundredths, and thousandths

x	0.3	0.03	0.003
2	2×0.3 $= 2 \times 3 \times 0.1$ $= 6 \times 0.1$ $= 0.6$	2×0.03 $= 2 \times 3 \times 0.01$ $= 6 \times 0.01$ $= 0.06$	2×0.003 $= 2 \times 3 \times 0.001$ $= 6 \times 0.001$ $= 0.006$
20	20×0.3 $= 2 \times 10 \times 3 \times 0.1$ $= 60 \times 0.1$ $= 6.0$	20×0.03 $= 2 \times 10 \times 3 \times 0.01$ $= 60 \times 0.01$ $= 0.60$	20×0.003 $= 2 \times 10 \times 3 \times 0.001$ $= 60 \times 0.001$ $= 0.060$
200	200×0.3 $= 2 \times 100 \times 3 \times 0.1$ $= 600 \times 0.1$ $= 60.0$	200×0.03 $= 2 \times 100 \times 3 \times 0.01$ $= 600 \times 0.01$ $= 6.00$	200×0.003 $= 2 \times 100 \times 3 \times 0.001$ $= 600 \times 0.001$ $= 0.600$

Find each product using the method shown in the table above.

1. $4 \times 0.2 =$ _____
2. $5 \times 0.6 =$ _____
3. $40 \times 0.07 =$ _____
4. $300 \times 0.3 =$ _____
5. $200 \times 0.08 =$ _____

4–8 Class Activity

Name _____ Date _____

▶ Shifts With Decimals

Leon earns $213 a month. The money is shown here. He will save some of it every month.

Leon's Earnings

$ 2 1 3 . _____ _____ _____

× 1

1 × $213 = $213

Answer the questions about the different savings plans.

1. If he saves 0.1 of his earnings, how much will he save each month?

_____

2. What happens to each bill?

_____

3. What happens to each digit?

_____

4. When you multiply by 0.1, does each digit shift to the right or left?

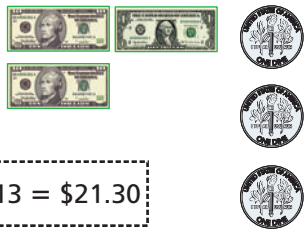
_____

5. How many places does each digit shift?

_____

Save 0.1 Each Month

$ _____ 2 1 . 3 0 _____



× 0.1

0.1 × $213 = $21.30

4–8 Class Activity

Name _____ Date _____

6. If he saves 0.01 of his earnings, how much will he save each month?

_____

7. What happens to each bill?

_____

8. What happens to each digit?

_____

9. When you multiply by 0.01, does each digit shift to the right or left?

_____

10. How many places does each digit shift?

_____

Save 0.01 Each Month

$ _ _ 2 . 1 3 _

× 0.01

0.01 × $213 = $2.13

11. If he saves 0.001 of his earnings, how much will he save each month?

_____

12. What happens to each bill?

_____

13. What happens to each digit?

_____

14. When you multiply by 0.001, does each digit shift to the right or left?

_____

15. How many places does each digit shift?

_____

Save 0.001 Each Month

$ _ _ 0 . 2 1 3

× 0.001

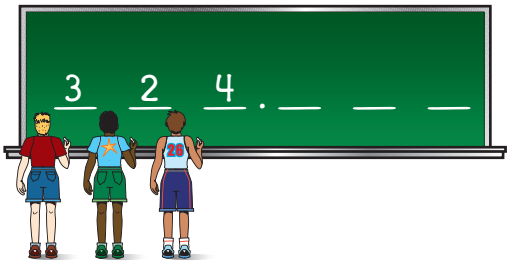
0.001 × $213 = $0.213

4–8 Class Activity

Name _____ Date _____

▶ See the Shift in Motion

Marla earns $324 a month. She will save some of her money every month. Three students can show how the digits shift at the board.



Complete each exercise.

16. Suppose Marla saves 0.1 of $324 every month.

$ 3 2 4 . _ _ _ × 0.1 $ _ 3 2 . 4 0 _

$324 shifts _____ place(s) to the _____. It becomes _____ as much.

17. Suppose Marla saves 0.01 of $324 every month.

$ 3 2 4 . _ _ _ × 0.01 $ _ _ 3 . 2 4 _

$324 shifts _____ place(s) to the _____. It becomes _____ as much.

18. Suppose Marla saves 0.001 of $324 every month.

$ 3 2 4 . _ _ _ × 0.001 $ _ _ 0 . 3 2 4

$324 shifts _____ place(s) to the _____. It becomes _____ as much.

Multiply.

19. 24 × 0.1 = _____

20. 24 × 0.01 = _____

21. 24 × 0.001 = _____

22. 689 × 0.1 = _____

23. 689 × 0.01 = _____

24. 689 × 0.001 = _____

Name _____ Date _____

▶ Shifts When Both Factors Are Decimals

Multiply by one tenth. Think about what it means to take one tenth of another part. You can think about money.

25. 0.1 × 0.4 = _____ Think: What is one tenth of one tenth? Then, what is one tenth of four tenths?

26. 0.1 × 0.04 = _____ Think: What is one tenth of one hundredth? Then, what is one tenth of four hundredths?

27. How many places did the 4 shift each time you multiplied? _____ In which direction? _____

28. Look at your answers. What pattern do you see in the number of decimal places in the products? How is it related to the number of places in the two factors?

_____

_____

_____

Multiply by one hundredth. Think about what it means to take one hundredth of another part.

29. 0.01 × 0.4 = _____ Think: What is one hundredth of one tenth? Then, what is one hundredth of four tenths?

30. 0.01 × 0.04 = _____ Think: What is one hundredth of one hundredth? Then, what is one hundredth of four hundredths?

31. How many places did the 4 shift each time you multiplied? _____ In which direction? _____

32. Look at your answers. What pattern do you see in the number of decimal places in the products? How is it related to the number of places in the two factors?

_____

_____

_____

Name _____ Date _____

33. How could you express the Big Idea about the number of decimal places in the product when you multiply a decimal number by another decimal number? Is it the same as the Big Idea for multiplying a decimal number by a whole number?

_____

_____

_____

_____

34. To multiply by 2 tenths or 2 hundredths, you could think of 2 tenths as 2 × 0.1 and 2 hundredths as 2 × 0.01.

0.2 × 0.4 = (2 × _____) × 0.4 = 2 × (0.1 × 0.4) = 2 × 0.04 = _____

0.02 × 0.4 = (2 × _____) × 0.4 = 2 × (0.01 × 0.4) = 2 × 0.004 = _____

Is your Big Idea about the number of decimal places in the product still true? _____

Use the shift pattern to solve each multiplication. Check to see if the Big Idea works.

35. 0.2 × 0.4 = _____

36. 0.2 × 0.04 = _____

37. 0.2 × 0.004 = _____

38. 0.02 × 0.4 = _____

39. 0.02 × 0.04 = _____

40. 0.02 × 0.004 = _____

41. 0.002 × 0.4 = _____

42. 2 × 0.4 = _____

4–8 Class Activity

Name _____ Date _____

Using the Big Idea you just discovered, solve each multiplication.

43. 0.3 × 0.4 = _____

44. 0.3 × 0.04 = _____

45. 0.3 × 0.004 = _____

46. 0.03 × 0.4 = _____

47. 0.03 × 0.04 = _____

48. 0.03 × 0.004 = _____

49. 0.003 × 0.4 = _____

50. 3 × 0.4 = _____

Solve.

Show your work.

51. Benjamin bought 6.2 pounds of rice. Each pound cost $0.90. How much did he spend on rice?

_____

52. Sabrina walks 0.85 mile to school. Kirk walks only 0.3 as far as Sabrina. How far does Kirk walk to school?

_____

53. Isabel wrote 4 letters to her pen pals. For each letter she bought a stamp. Each stamp cost $0.60. How much did she spend on stamps?

_____

54. Maura rode her bike 5 laps around the block. Each lap is 0.45 mile. How many miles did she ride?

_____

55. Kim bought 2 pounds of baked turkey that cost $5.98 per pound. What was the total cost?

_____

4–9 Class Activity

Name _____ Date _____

▶ Compare Whole Number and Decimal Multipliers

Complete each sentence.

Whole Number Multipliers

1. When you multiply by 10, the number gets _____ times as big. The places shift _____ place(s) to the _____.

3. When you multiply by 100, the number gets _____ times as big. The places shift _____ place(s) to the _____.

5. When you multiply by 1,000, the number gets _____ times as big. The places shift _____ place(s) to the _____.

Decimal Number Multipliers

2. When you multiply by 0.1, the number gets _____ as big. The places shift _____ place(s) to the _____.

4. When you multiply by 0.01, the number gets _____ as big. The places shift _____ place(s) to the _____.

6. When you multiply by 0.001, the number gets _____ as big. The places shift _____ place(s) to the _____.

7. How is multiplying by 10 or 100 or 1,000 like multiplying by 0.1 or 0.01 or 0.001? How is it different?

_____

_____

_____

_____

_____

For each exercise, discuss the shift. Then find each product.

8. $\begin{array}{r} 3.6 \\ \times\ 10 \\ \hline \end{array}$

9. $\begin{array}{r} 3.6 \\ \times\ 0.1 \\ \hline \end{array}$

10. $\begin{array}{r} 3.6 \\ \times\ 100 \\ \hline \end{array}$

11. $\begin{array}{r} 3.6 \\ \times\ 0.01 \\ \hline \end{array}$

12. $\begin{array}{r} 3.6 \\ \times\ 1{,}000 \\ \hline \end{array}$

13. $\begin{array}{r} 3.6 \\ \times\ 0.001 \\ \hline \end{array}$

14. $\begin{array}{r} 3.6 \\ \times\ 1 \\ \hline \end{array}$

15. $\begin{array}{r} 3.6 \\ \times\ 1.0 \\ \hline \end{array}$

Name _____ Date _____

▶ Extend and Apply the Big Idea

Zeros at the end of a decimal number do not change the value of the number. Remember this as you explore the Big Idea about the number of decimal places in a product.

These exercises all have an "extra" zero in the product because of the 5-pattern. Complete each multiplication.

16. $0.5 \times 2 =$ _____

17. $0.08 \times 0.5 =$ _____

18. $0.06 \times 0.05 =$ _____

19. $0.4 \times 0.5 =$ _____

20. Does the Big Idea about the product having the same number of decimal places as the two factors still work? _____

These problems are all the same, but are expressed in different ways. Multiply.

21. $3 \times 3 =$ _____

22. $3.0 \times 3 =$ _____

23. $3.0 \times 3.0 =$ _____

24. $3.00 \times 3.00 =$ _____

25. Does the Big Idea about the product having the same number of decimal places as the two factors still work? Do your answers all mean the same thing? _____

Solve.

Show your work.

26. Ada and her family are canoeing in the wilderness. They carry the canoe along trails between lakes. Their map gives each trail distance in rods. They know that a rod is equal to 5.5 yards. Find each trail distance in yards.

Black Bear Trail; 8 rods _____

Wild Flower Trail; 9.3 rods _____

Dark Cloud Trail; 24.1 rods _____

27. The world's largest diamond is the Star of Africa, which is 530.2 carats. A carat is about 0.2 gram. What is the weight of the Star of Africa in grams?

_____

4–10 Class Activity

Name _____ Date _____

▶ Review of Rounding

Round each number.

1. Round 42 to the nearest ten. Which ten is closer to 42?

_____

50
42
40

2. Round 762 to the nearest hundred. Which hundred is closer to 762?

_____

800
762
700

3. Round 0.86 to the nearest tenth. Which tenth is closer to 0.86?

_____

0.9
0.86
0.8

4. Round 0.263 to the nearest hundredth. Which hundredth is closer to 0.263?

_____

0.27
0.263
0.26

Round to the nearest ten.

5. 46 _____ **6.** 71 _____ **7.** 85 _____ **8.** 928 _____

Round to the nearest hundred.

9. 231 _____ **10.** 459 _____ **11.** 893 _____ **12.** 350 _____

Round to the nearest tenth.

13. 0.73 _____ **14.** 0.91 _____ **15.** 0.15 _____ **16.** 0.483 _____

Round to the nearest hundredth.

17. 0.532 _____ **18.** 0.609 _____ **19.** 0.789 _____ **20.** 0.165 _____

Name _____ Date _____

▶ Explore Estimation in Multiplication

For each exercise, round the factors and multiply mentally to find the estimated answer. After finding all the estimated answers, go back and find each exact answer.

	Estimated Answer	Exact Answer
21.	24 × 39 ≈ _____	24 × 39 = _____
22.	151 × 32 ≈ _____	151 × 32 = _____
23.	0.74 × 0.21 ≈ _____	0.74 × 0.21 = _____
24.	12.3 × 3.7 ≈ _____	12.3 × 3.7 = _____

25. Is there more than one way to round these numbers? Why are some exact answers closer to the estimated answer than others?

_____

_____

_____

▶ Use Estimation to Check Answers

26. Tanya did these multiplications on her calculator.

24.5 × 4 = 98	0.56 × 30 = 1.68	15.2 × 2.03 = 30.856
0.09 × 143 = 12.87	0.74 × 12.02 = 88.948	9.03 × 6.9 = 623.07

How can she use estimation to see if each answer makes sense? Which answers are clearly wrong?

_____

_____

_____

_____

_____

_____

Name _____ Date _____

▶ Ordinary Estimations and Safe Estimations

Dear Math Students:

Yesterday I went to the store to buy 8 bottles of juice for a party. Each bottle cost $2.48 so I rounded to the nearest dollar, which is $2.00. My estimate for the total cost was 8 × $2.00 = $16.00. I had $18.00 in my picket, so I thought everything was fine. when I went to the cashier to pay, I found out that I didn't have enough money. I was very embarrassed.

Is there something wrong with my math? Maybe estimation isn't very helpful when you're buying things. What do you think?

Thank you.

Puzzled Penguin

Show your work.

27. Respond to the Puzzled Penguin in your Math Journal.

For each problem below, decide whether you need to make a safe estimate or an ordinary estimate. Estimate the answer, and then find the exact answer. Estimates will vary.

28. Michelle and Stacy walked 9.95 miles every day for 14 days. How far did they walk altogether?

Safe estimate or ordinary estimate? _____

Estimate: _____ Exact answer: _____

29. Mrs. Reno is planning to buy 3 bicycles for her children. Each bicycle costs $144.78, including the tax. How much will Mrs. Reno need to buy all 3 bicycles?

Safe estimate or ordinary estimate? _____

Estimate: _____ Exact answer: _____

30. Each bag of soil in the Green Thumb Garden Center weighs 6.89 kilograms. There are 21 bags. What is the total weight of the bags?

Safe estimate or ordinary estimate? _____

Estimate: _____ Exact answer: _____

31. On the Back Explain your answer for problem 29. Which estimation did you choose? Why?

Name Date

4–11 Class Activity

Name _____ Date _____

▶ Practice With Decimals

Suppose you know that 234 × 48 = 11,232. Use this to find each product.

1. 23.4 × 4.8 = _____
2. 0.234 × 4.8 = _____
3. 0.234 × 0.48 = _____
4. 0.48 × 2.34 = _____
5. 48 × 23.4 = _____
6. 4.8 × 2.34 = _____
7. 23.4 × 0.048 = _____
8. 2.34 × 0.048 = _____
9. 234 × 4.8 = _____
10. 48 × 0.234 = _____

Find each product. You may need a separate sheet of paper.

11. 46 × 0.9
12. 75 × 0.8
13. 97 × 0.04
14. 64 × 0.05
15. 0.346 × 127
16. 597 × 0.284
17. 4.59 × 57.3
18. 0.924 × 0.865

Round to the nearest tenth.

19. 0.68 _____
20. 0.93 _____
21. 0.841 _____
22. 0.092 _____

Round to the nearest hundredth.

23. 0.492 _____
24. 0.218 _____
25. 0.907 _____
26. 0.569 _____

Name _____ Date _____

▶ Solve Word Problems

Solve.

Show your work.

27. Marcus sails his boat 94.5 miles every day. If he sails for 25 days, how far will he travel in all?

_____

28. The distance around a circle (the circumference) is about 3.14 times the diameter. If a circular table has a diameter of 36 inches, what is the circumference?

_____

29. Nina is reading about red kangaroos. She found out that a male red kangaroo usually weighs about 66 kilograms, and a female red kangaroo usually weighs about 26.5 kilograms. One kilogram is about 2.2 pounds. What is the weight of a male red kangaroo in pounds?

_____

30. What is the weight of a female red kangaroo in pounds?

_____

31. A printer has 395 ink colors and 254 styles of letters (fonts). How many different combinations are possible?

_____

32. Jodie wants to buy a ticket for every basketball game this season. Tickets cost $16.50 each, and there are 15 games this season. How much will Jodie spend on tickets?

_____

Name _____ Date _____

▶ Use Calculation, Estimation, or Mental Math

There are different ways that you can solve problems depending upon the type of answer that you need.

- If the problem asks for an exact answer then you need to do the calculation.

USE CALCULATION
The cost of a movie ticket is $6.25. If 7 friends go to the movies, how much money will they need?

$7 \times \$6.25 = \$43.75$

- If a question uses words such as *about*, *approximately*, *almost*, *nearly*, or *enough*, then you can estimate your answer.

USE ESTIMATION
Hector earns $8.05 per hour. Last week he worked 19.5 hours. About how much did he earn?

$19.5 \times \$8.05 \approx 20 \times \$8 = \$160$
Hector earned about $160.

- For some problems, you can use mental math.

USE MENTAL MATH
Angela is training for a race. Last week she ran 400 meters 15 times. How many meters did she run altogether?

$15 \times 400 = 15 \times 4 \times 100 =$
$60 \times 100 = 6{,}000$ meters

For each question, write whether to use calculation, estimation, or mental math. Then solve.

1. The Math Club is selling packs of paper for $1.95. The first week they sold 125 packs. The next week they sold 376 packs and the third week they sold 408 packs. About how much money did they collect in all?

_____

2. The Math Club ordered 2,000 packs of paper. Each pack contains 150 sheets of paper. How many sheets is this in all?

_____

_____

3. **On the Back** Write and solve three multiplication word problems. Solve at least one by estimating.

Name _____ Date _____

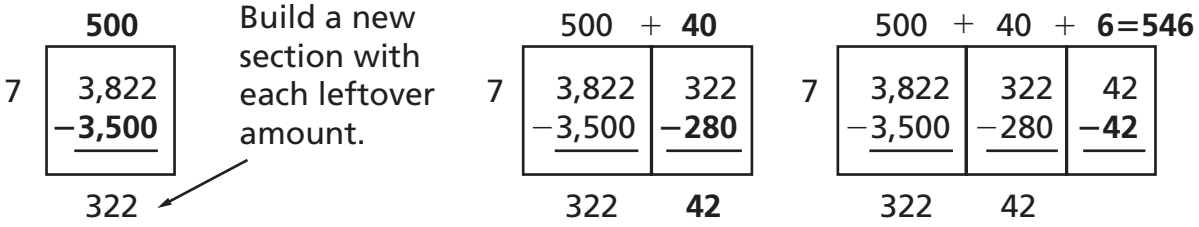
4–12 Class Activity

Name Date

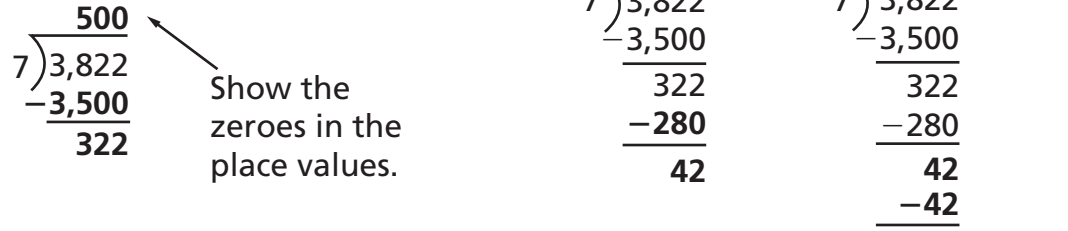
▶ Compare Division Methods

An airplane travels the same distance every day. It travels 3,822 miles in a week. Compare these methods of dividing that can be used to find how many miles the airplane travels each day.

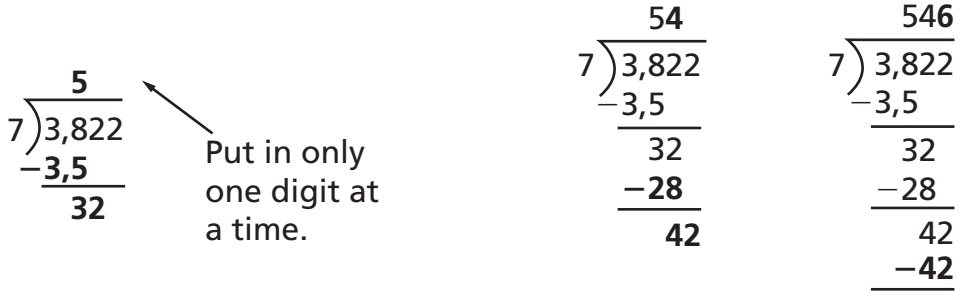
Rectangle Sections



Expanded Notation



Digit-By-Digit



4–12 Class Activity

Name _____ Date _____

Vocabulary
remainder

▶ Division Problems

Solve.

1. A farmer has 2,106 cows and 9 barns. If the farmer divides the cows into equal groups, how many cows will he put in each barn?

_____

2. A sidewalk covers 3,372 square feet. If the sidewalk is 4 feet wide, what is its length?

_____

3. Olivia has $8. Her mother has $4,784. How many times as much money does Olivia's mother have as Olivia?

_____

4. A potter can make 2,513 different kinds of pots and bowls by combining different shapes and colors. If he knows how to make 7 different shapes, how many colors does the potter have?

_____

▶ Work With Remainders

This problem might seem unfinished. The leftover number at the bottom is called the **remainder**. We can write the answer like this: 567 R 2

```
  567
8)4,538
- 40
  53
- 48
  58
- 56
   2
```

5. Could there be a remainder of 9 for the problem? Why or why not?

_____

_____

_____

6. What is the largest possible remainder when dividing by 8?

_____

Complete each division and give the remainder.

7. $6\overline{)5,380}$

8. $7\overline{)6,747}$

9. $5\overline{)4,914}$

4–12 Going Further

Name _____ Date _____

Vocabulary
mean (average)
measure of central tendency

▶ Find the Mean

The **mean** is one way to describe a set of data. The mean, sometimes called the **average**, is a **measure of central tendency**.

The mean is the size of each of *n* equal groups made from *n* data values.

Stephan found the mean of this data set: 40, 162, 100, 38.

- Step 1: 40 + 162 + 100 + 38 = 340
- Step 2: 340 ÷ 4 = 85
  The mean is 85.

1. Discuss what steps Stephan took and why they give the mean.

Find the mean for each set of data.

Show your work.

2. 24, 27, 25, 24 _____
3. 13, 17, 14, 18, 15, 14, 14 _____
4. 1, 1, 4, 2, 1, 3, 1, 4, 2, 1 _____
5. 350, 400, 450, 100, 500 _____

Solve.

6. Jan's cousins are 144 cm, 150 cm, 131 cm, 160 cm, and 150 cm tall. What is the mean height of Jan's cousins?

_____

7. Mia's math test scores were 96, 80, 100, and 100. What was Mia's average math test score?

_____

8. There are 1,010 students at Ridge School. At Valley School, there are 851 students. At Park School, there are 860 students. What is the mean number of students for the three schools?

_____

9. **On the Back** Write and solve two problems that involve finding the mean.

Name _____ Date _____

4–13 Class Activity

Name Date

▶ Division With Decimal Amounts

Three friends set up a lemonade stand and made $20.25. They will share the money equally. Study the steps below to see how much money each person should get.

When the $20 is split 3 ways, each person gets $6. There is $2 left.

$$\begin{array}{r} \mathbf{6} \\ 3\overline{)20.25} \\ -\ \mathbf{18} \\ \hline \mathbf{2} \end{array}$$

We change the $2 to 20 dimes and add the other 2 dimes. There are 22 dimes.

$$\begin{array}{r} 6. \\ 3\overline{)20.25} \\ -\ 18 \\ \hline 2.\mathbf{2} \end{array}$$

When we split 22 dimes 3 ways, each person gets 7 dimes. There is 1 dime left.

$$\begin{array}{r} 6.\mathbf{7} \\ 3\overline{)20.25} \\ -\ 18 \\ \hline 2.2 \\ -\ \mathbf{2.1} \\ \hline \mathbf{.1} \end{array}$$

We change the dime to 10 cents and add the other 5 cents. Now we split 15 cents 3 ways.

$$\begin{array}{r} 6.\mathbf{75} \\ 3\overline{)20.25} \\ -\ 18 \\ \hline 2.2 \\ -\ 2.1 \\ \hline .\mathbf{15} \\ -\ \mathbf{.15} \\ \hline \end{array}$$

Solve each decimal division exercise on a separate sheet of paper.

1. $8\overline{)47.68}$
2. $9\overline{)58.68}$
3. $6\overline{)316.2}$

Solve.

Show your work.

4. Imelda has 8.169 meters of rope. She wants to cut it into 3 equal pieces to make jump ropes for her 3 friends. How long will each jump rope be?

5. Tonio has 7.47 pounds of rabbit food. He will divide it equally among his 9 rabbits. How much food will each rabbit get?

6. Discuss how dividing a decimal number is like dividing a whole number.

4–13 Class Activity

Name _____ Date _____

Use multiplication to help you solve these problems.

7. $32 \div 8 =$ _____

$8 \times$ _____ $= 32$

$8\overline{)32}$

8. $3.2 \div 8 =$ _____

$8 \times$ _____ $= 3.2$

$8\overline{)3.2}$

9. $0.32 \div 8 =$ _____

$8 \times$ _____ $= 0.32$

$8\overline{)0.32}$

10. $0.032 \div 8 =$ _____

$8 \times$ _____ $= 0.032$

$8\overline{)0.032}$

Solve using mental math. Check using multiplication.

11. $6.3 \div 9 =$ _____

12. $0.15 \div 3 =$ _____

13. $4.8 \div 6 =$ _____

14. $0.021 \div 7 =$ _____

▶ Add Zeros to the Dividend

Jun must run 6.65 miles every day for practice. She knows that if she runs half of that distance and back again she will have run enough miles. How far should Jun run before she turns around to run back?

$$
\begin{array}{r}
3.325 \\
2\overline{)6.650} \\
-6 \\
\hline
0.6 \\
.6 \\
\hline
.05 \\
.04 \\
\hline
.010 \\
.010
\end{array}
$$

She adds a zero to the end of the decimal number.

This allows her to finish solving the problem.

15. Discuss whether adding zeros to the end of a decimal number changes its value.

16. Discuss whether adding zeros to whole numbers like 27 changes the value.

17. What is the rule about where you can add zeros without changing the value?

_____

_____

Solve each exercise. You may need a separate sheet of paper.

18. $6\overline{)54.75}$

19. $5\overline{)141.2}$

20. $8\overline{)310}$

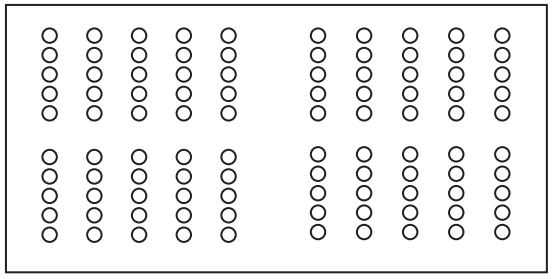
4–14 Class Activity

Name Date

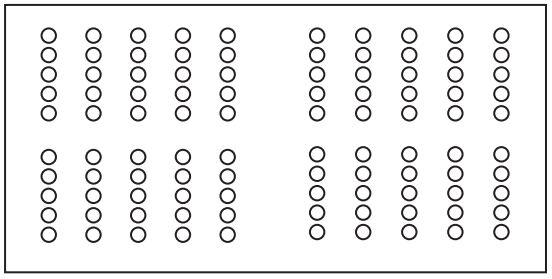
▶ Write Fractions as Decimals

Fractions and decimals are both ways to show parts of a whole.

1. Divide 100 pennies into 4 equal parts.



2. Divide 100 pennies into 8 equal parts.



3. Write one fourth of a dollar as a decimal number: _____

4. Write one eighth of a dollar as a decimal number: _____

Use long division to write each fraction as a decimal.

5. $\frac{1}{4}$ $4\overline{)1.00}$

6. $\frac{2}{4}$ $4\overline{)2.00}$

7. $\frac{3}{4}$ $4\overline{)3.00}$

8. $\frac{1}{8}$ $8\overline{)1.000}$

9. $\frac{2}{8}$ $8\overline{)2.000}$

10. $\frac{3}{8}$ $8\overline{)3.000}$

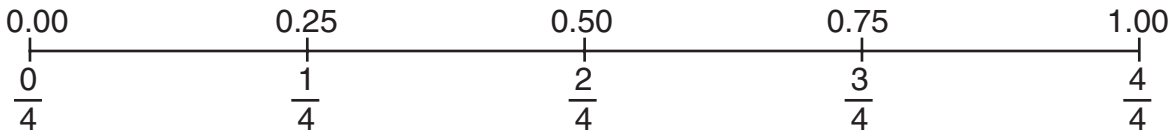
11. $\frac{4}{8}$ $8\overline{)4.000}$

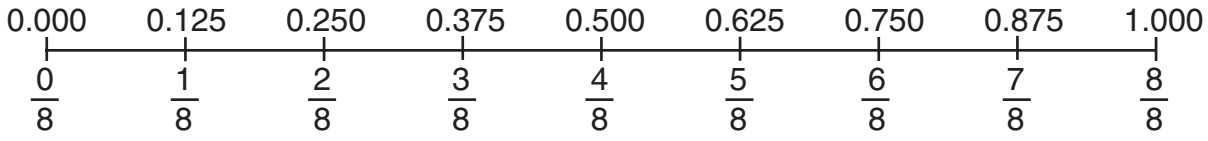
12. $\frac{5}{8}$ $8\overline{)5.000}$

13. $\frac{6}{8}$ $8\overline{)6.000}$

14. $\frac{7}{8}$ $8\overline{)7.000}$

Use these number lines to discuss questions 15 and 16.





15. What patterns do you see?

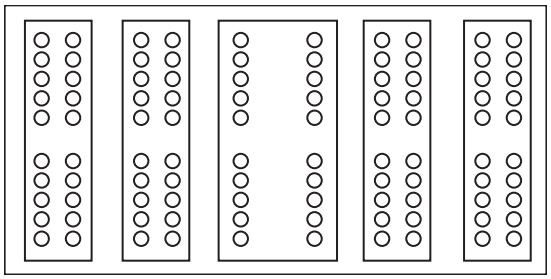
_____

16. Which decimal numbers are equal in value?

_____

Name _____ Date _____

17. Divide 100 pennies into 5 equal parts.

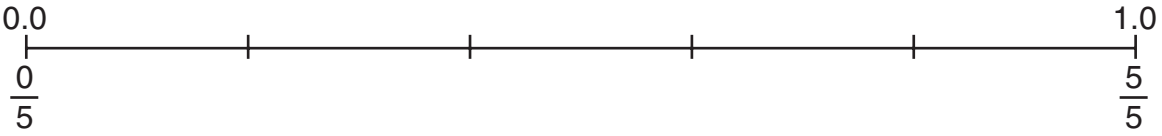


18. Use long division to find the decimal numbers for fifths.

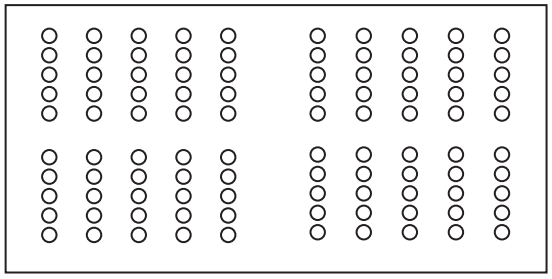
$\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$

)____)____)____)____

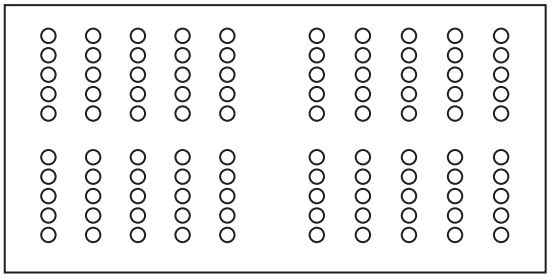
19. Make a number line showing the decimal numbers and fractions for fifths.



20. Divide 100 pennies into 3 equal parts.



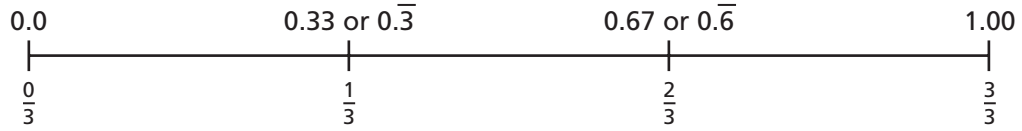
21. Divide 100 pennies into 6 equal parts.

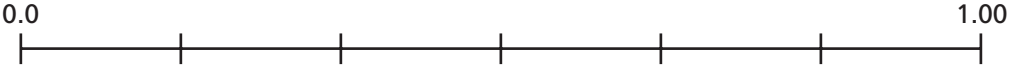


22. Use long division to find the decimal numbers for thirds and sixths.

$\frac{1}{3}$ $3\overline{)1.00000}$ $\frac{2}{3}$ $3\overline{)2.00000}$ $\frac{1}{6}$ $6\overline{)1.00000}$ $\frac{5}{6}$ $6\overline{)5.00000}$

23. Fill in the number line showing the decimal numbers and fractions for sixths.





Name _____ Date _____

▶ Word Problems

In baseball and softball, a batting average describes how well a player hits. (It is not a mean even though it is called an average!) A player's batting average is a fraction with the number of hits over the number of at bats. These fractions are usually written as decimals with three places.

$$\frac{\text{3 hits}}{\text{9 at bats}}$$

Solve. Give the batting average as a fraction and as a decimal.

Show your work.

24. In the first four games of the season, Lauryn got 3 hits in 9 at bats. What was her batting average?

_____

25. Felicia is on a softball team. In her first 8 at bats, she got 5 hits. What was her batting average?

_____

26. On Saturday, Allie played baseball with her family. She had 3 at bats and got 2 hits. What was her batting average?

_____

Solve.

27. Carl's baseball team had a picnic. The coach bought $3\frac{1}{2}$ pounds of potato salad for the picnic, paying $2.25 per pound. How much did the potato salad cost?

_____

28. At the team picnic, the players raced on an obstacle course that the coach planned. The first part of the race was on a trail $\frac{3}{8}$ mile long. The second part was on a park road 0.4 mile long. What was the total length of the race?

_____

Name _____ Date _____

▶ Problems Involving Means

The mean (average) of a data set is the equal group that describes the data set.
To find it:

- Add all of the numbers in the data set.
- Divide the total by the number of items in the data set.

Tyra is training for a race. She ran these distances last week:

$3\frac{1}{2}$ miles, $3\frac{1}{4}$ miles, $4\frac{1}{8}$ miles, 4 miles, and $3\frac{2}{5}$ miles. To find the mean, she wrote all the fractions in decimal form and then added them and divided by 5. Tyra's mean training distance was 3.655 miles.

$$\begin{array}{r} 3.5 \\ 3.25 \\ 4.125 \\ 4 \\ +\ 3.4 \\ \hline 18.275 \end{array}$$

$$5\overline{)18.275} \quad 3.655$$

Solve. Change fractions to decimals if it is easier.

Show your work.

1. Tyra drinks a lot of water on the day of a race. At the last race she drank $1\frac{1}{2}$ cups, $1\frac{7}{8}$ cups, and $3\frac{2}{5}$ cups. What was the mean amount of water that Tyra drank?

_____

2. Sam works at a deli counter. His boss asked him to find the mean weight of the next four customer orders. The orders were: $1\frac{1}{4}$ pounds of ham, $1\frac{1}{2}$ pounds of cheese, 2 pounds of turkey, and $2\frac{3}{4}$ pounds of roast beef. What was the mean weight? Try to solve this with fractions.

_____

3. Tony and his friends sold snacks at the school play to raise money for the Drama Club. They collected $12.50 for muffins, $3.75 for apples, $5.60 for cranberry juice, $12.50 for soft pretzels, $16.00 for frozen yogurt, and $1.40 for carrot sticks. What was the mean amount of money collected?

_____

4–15 Class Activity

Name Date

Vocabulary
- estimate
- Digit by Digit
- Expanded Notation
- Rectangle Sections

▶ Experiment With Two-Digit Divisors

When we divide by a two-digit number, we build the unknown factor place by place just as we did before. But now we must **estimate** each number in the answer.

There are 2,048 sheep being sent on a train. Each railroad car holds 32 sheep.

To find how many railroad cars are needed for the sheep, divide 2,048 by 32.

Here are three methods to divide 2,048 by 32. Discuss the steps in each method. Discuss how the methods are alike and different.

Digit by Digit

Step 1	Step 2	Step 3	Step 4
32) 2,048 (30)	6 32) 2,048 (30)	6 32) 2,048 (30) –1 92 128	64 32) 2,048 (30) –1 92 128 –128
Round the divisor.	Estimate the first digit: 30 goes into 200 about 6 times.	Multiply and Subtract Bring down 8 ones.	Estimate the next digit and multiply.

Expanded Notation

Step 1	Step 2	Step 3	Step 4
32) 2,048 (30)	60 32) 2,048 (30)	60 32) 2,048 (30) –1,920 128	4 60 } 64 32) 2,048 (30) –1,920 128 –128
Round the divisor.	Estimate the first number: 30 goes into 2,000 about 60 times.	Multiply and Subtract 60×32 = 1,920	Estimate the next number and multiply.

Rectangle Sections

Step 1	Step 2	Step 3	Step 4
60 32 (30) | 2,048	60 32 (30) | 2,048 –1,920	60 + 32 (30) | 2,048 1,920 | 128	60 + 4 32 (30) | 2,048 –1,920 | 128 –128
	128	128	128 0
Round the divisor and estimate the first number.	Multiply and Subtract.	Make a new section.	Estimate the next number and multiply and subtract.

Name Date

Look at exercises 1–3. Would you round the divisor up or down to estimate the first number? Complete each exercise, using any method you choose.

1. $79\overline{)4{,}032}$ **2.** $21\overline{)1{,}533}$ **3.** $18\overline{)1{,}061}$

▶ Does Estimation Always Work?

Complete exercise 4 as a class. Does the rounding give you a correct estimate of the first digit? Does it give you a correct estimate of the next digit? Discuss what you can do to finish the problem.

4. $54\overline{)3{,}509}$

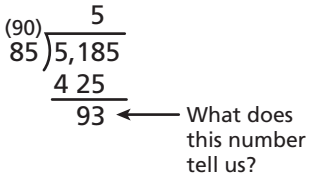
Complete and discuss each exercise below. Use any method you choose.

5. $74\overline{)3{,}651}$ **6.** $42\overline{)3{,}231}$ **7.** $23\overline{)1{,}892}$

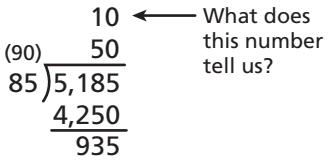
Name Date

▶ Underestimating

Here are two ways to divide 5,185 ÷ 85. Discuss each method and answer the questions as a class.



How do we know that the first estimated number is not right? What number should we try next? Solve the problem using that number.



How do we know that the first estimated number is not right this time? Do we need to erase, or could we just finish solving the problem? Try it.

1. When we estimate with a number that is too big (overestimate), we have to erase and change the number. When we estimate with a number that is too small (underestimate), do we always have to erase? Explain your answer.

Solve each division. You may need to adjust one or both of the estimated numbers.

2. $56\overline{)4{,}032}$ **3.** $77\overline{)4{,}791}$ **4.** $18\overline{)798}$

Name _____ Date _____

Think about what kind of divisor is most likely to lead to an estimated number that is wrong. Test your idea by doing the first step of each problem below.

5. $41\overline{)2{,}583}$ **6.** $34\overline{)1{,}525}$ **7.** $29\overline{)928}$ **8.** $16\overline{)1{,}461}$

9. What kind of divisor is most likely to lead to an estimated number that is wrong? How can you adjust for these cases?

_____

_____

_____

▶ Mixed Practice With Adjusted Estimates

Solve. You may need a separate sheet of paper.

10. Hector picked 1,375 oranges in his fruit orchard. He will pack them in crates to take to the market. Each crate holds 24 oranges.

How many crates will Hector fill? _____

How many oranges will be left over? _____

11. The skateboards at the Speed Demon Shop sell for $76 each. This week the shop owner sold $5,396 worth of skateboards.

How many skateboards were sold?

_____

12. Ashley's dog Tuffy eats 21 ounces of dog food for each meal. Ashley has 1,620 ounces of food in the house.

How many meals will Tuffy have before Ashley needs to buy more food? _____

How many ounces of food will be left after the last meal? _____

4–17 Class Activity

Name _____ Date _____

▶ Decide What to Do With the Remainder

When you divide to solve a problem, you need to decide what to do with the remainder to answer the question.

Think about each of these ways to use a remainder. Solve each problem. Show your work.

Sometimes you ignore the remainder.

1. The gift-wrapping department of a store has a roll of ribbon 1,780 inches long. It takes 1 yard of ribbon (36 inches) to wrap each gift.

How many gifts can be wrapped?

_____

Why do you ignore the remainder?

_____

_____

_____

Sometimes you round up to the next whole number.

2. There are 247 people traveling to the basketball tournament by bus this year. Each bus holds 52 people.

How many buses will be needed?

_____

Why do you round up?

_____

_____

_____

_____

Sometimes you use the remainder to form a fraction.

3. The 28 students in Mrs. Colby's class will share 98 slices of pizza equally at the class picnic.

How many slices will each student get?

_____

Look at the division shown here. Explain how to get the fraction after you find the remainder.

$$\begin{array}{r} 3\frac{1}{2} \\ 28\overline{)\,98} \\ -84 \\ \hline 14 \end{array}$$

_____

_____

_____

_____

4–17 Class Activity

Name _____ Date _____

Sometimes you use a decimal number instead of the remainder.

Suppose 16 friends earned $348 at a car wash, and they want to divide the money equally. To find how much each person will get, one of the friends divided as shown here. Each friend will get $21.75.

```
   21.75
16)348.00
  −32
   28
   16
   120
   112
    80
    80
```

4. A rectangular garden has an area of 882 square meters. The long side of the garden is 35 meters long. How long is the short side?

_____

Sometimes the remainder is the answer to the problem.

5. A bagel shop has 138 bagels to be packed into boxes of 12 to be sold. The extra bagels are for the workers.

   How many bagels will the workers get? _____
   Why is the remainder the answer?

_____

_____

_____

▶ Practice Solving Problems Involving Remainders

Solve.

Show your work.

6. At the Cactus Flower Cafe, all the tips are divided equally among the waiters. Last night the 16 waiters took in $1,108. How much did each waiter get in tips?

_____

7. A gardener needs to move 2,150 pounds of dirt. He can carry 98 pounds in his wheelbarrow. How many trips will he need to make with the wheelbarrow?

_____

Name _____ Date _____

Solve.

Show your work.

8. Mia must work 133 hours during the month of May. There are 21 working days in May this year. How many hours per day will Mia work if she works the same number of hours each day?

_____

9. Colored markers cost 78 cents each. Pablo has $8.63 in his pocket. How many colored markers can Pablo buy?

_____

10. A meat packer has 180 kilograms of ground meat. He will divide it equally into 50 packages. How much will each package weigh?

_____

11. In volleyball there are 12 players on the court. If 75 people all want to play volleyball at a gym that has more than enough courts, how many of them must sit out at one time?

_____

12. At the Fourth of July celebration, 1,408 ounces of lemonade will be shared equally by 88 people. How many ounces of lemonade will each person get?

_____

13. Armando needs quarters to ride the bus each day. He took $14.87 to the bank and asked to have it changed into quarters. How many quarters did he get?

_____

14. **On the Back** Write and solve two division word problems. Each problem should use a different way to interpret the remainder.

Name _____ Date _____

4–18 Class Activity

Name _____ Date _____

▶ Use Money to See Shift Patterns

Jordan earns $243 a week. The money is shown here.

Jordan's Earnings in Dollars

$ _____ _____ _____ 2 4 3

÷ 1

$243 ÷ 1 = $243

Answer each question about how much Jordan earns in coins.

1. How many dimes ($0.10) does he earn?

_____

_____

2. What happens to each dollar? Why?

_____

_____

3. What happens to the number showing Jordan's earnings?

_____

_____

4. When you divide by 0.1, does each digit shift right or left?

_____

_____

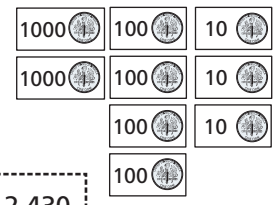
5. How many places does each digit shift?

_____

_____

Jordan's Earnings in Dimes

$ _____ _____ 2 , 4 3 0



÷ 0.1

243 ÷ 0.1 = 2,430

Name _____ Date _____

6. How many pennies ($0.01) does he earn?

_____

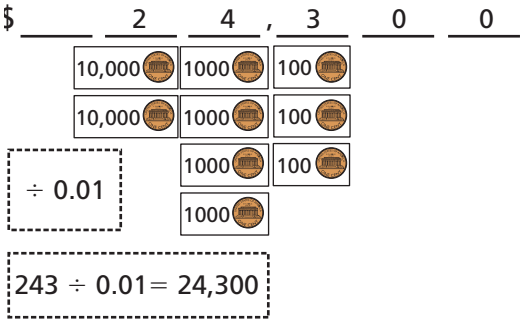
7. What happens to each dollar?

_____

8. What happens to the number showing Jordan's earnings?

_____

Jordan's Earnings in Pennies



9. When you divide by 0.01, does each digit shift right or left? Why?

_____

10. How many places does each digit shift? Why?

_____

11. How many tenths of a cent ($0.001) does he earn?

_____

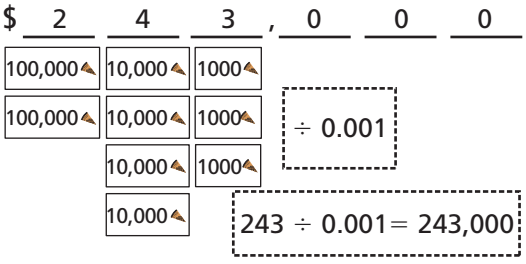
12. What happens to each dollar?

_____

13. What happens to the number showing Jordan's earnings? Why?

_____

Jordan's Earnings in Tenths of a Cent



14. When you divide by 0.001, does each digit shift right or left? Why?

_____

15. How many places does each digit shift? Why?

_____

4–18 Class Activity

Name _____ Date _____

▶ Relate Decimal Division to Multiplication

Solve.

Show your work.

16. Mrs. Moreno made 1 liter of grape jelly. She will pour it into jars that each hold 0.1 of a liter. How many jars will she need?

Think: How many tenths are there in 1 whole? _____

Complete the equation: 1 ÷ 0.1 = _____

This answer is the same as 1 × _____

17. Mr. Moreno made 2 liters of spaghetti sauce. He will also pour it into jars that each hold 0.1 of a liter. How many jars will he need?

Think: How many tenths are there in 1 whole? _____

In 2 wholes? _____

Complete the equation: 2 ÷ 0.1 = _____

This answer is the same as 2 × _____

18. The Morenos made a kiloliter of fruit punch for a large party. They will pour it into punch bowls that each hold 0.01 kiloliter. How many bowls will they need?

Think: How many hundredths are there in 1 whole? _____

Complete the equation: 1 ÷ 0.01 = _____

This answer is the same as 1 × _____

19. Why do we get a larger number when we divide by a decimal number that is less than one?

_____

_____

_____

_____

Name Date

Dear Math Students:

One of my friends says that dividing a number by one tenth (0.1) is the same as multiplying the number by 10. He also says that dividing by one hundredth (0.01) is the same as multiplying by 100. He thinks this is also true for one thousandth, one millionth, and so on.

Is he right? I don't see how this can be true. Usually multiplication gives us a larger number, and division gives us a smaller number. So this would be very strange. Can you explain it?

Thank you.

Puzzled Penguin

20.

▶ Change Decimal Divisors to Whole Numbers

It is easier to divide when the divisor is a whole number. We can change the divisor to a whole number by using the strategy below.

Discuss each step used to find 6 ÷ 0.2.

Understand the Division Problem

Step 1: We know that 6 ÷ 0.2 can be written as a fraction: $\longrightarrow 6 \div 0.2 = \frac{6}{0.2}$

Step 2: We can make an equivalent fraction with a whole number divisor by multiplying the numerator and denominator by 10. Now we can divide 60 by 2. $\longrightarrow \frac{6 \times 10}{0.2 \times 10} = \frac{60}{2} = 2\overline{)60}$

21. Why will the answer to 60 ÷ 2 be the same as the answer to 6 ÷ 0.2?

Name _____ Date _____

Solve with long division.

Step 1: We can multiply both numbers by 10 in long division format. First, put a decimal point after the whole number.

→ $0.2\overline{)6.}$

→ $0.2\overset{\smile}{.}\overline{)6.0\overset{\smile}{.}}$

Step 2: Then we multiply both numbers by 10, which moves the decimal points one place to the right. We add zeros if necessary:

→ $0.2_{\wedge}\overline{)\begin{array}{r}30.\\6.0_{\wedge}\end{array}}$

Step 3: We don't have to draw arrows. A little mark called a caret (^) shows where we put the "new" decimal points. Now we divide 60 by 2, just as we did with equivalent fractions.

22. Why does moving both decimal points the same number of places give us the same answer?

_____

_____

Answer each question to describe how to find 6 ÷ 0.02 and 6 ÷ 0.002.

23. Suppose you want to find 6 ÷ 0.02.

By what number can you multiply 0.02 to get a whole number? _____

Describe and show how to move the decimal points to solve 6 ÷ 0.02 by long division. $0.02\overline{)6.}$

_____

24. Suppose you want to find 6 ÷ 0.002.

Describe and show how to move the decimal points to solve 6 ÷ 0.002. $0.002\overline{)6.}$

_____

25. $0.5\overline{)45}$ **26.** $0.07\overline{)56}$ **27.** $0.8\overline{)496}$ **28.** $0.65\overline{)910}$

29. On the Back Explain why your method for exercise 24 is right.

4–18 Class Activity

Name _____ Date _____

4–19 Class Activity

Name Date

▶ Use Money to See Shift Patterns

It costs \$0.312 (31 cents and $\frac{2}{10}$ cent) to make one Cat's Eye Marble. The money is shown here.

Cost of a Cat's Eye Marble

\$ ____ ____ 0 . 3 1 2

÷ 1

\$0.312 ÷ 1 = \$0.312

Answer each question about the different coins.

1. How many dimes (\$0.10) does it cost to make one Cat's Eye Marble? Why?

_____

_____

2. What happens to the number that shows the cost?

_____

3. When you divide by 0.1 does each digit shift to the right or left? Why?

_____

_____

4. How many places does each digit shift? Why?

_____

_____

____ ____ 3 . 1 2 ____

3 | 0.1 | 0.02

÷ 0.1

0.312 ÷ 0.1 = 3.12

4–19 Class Activity

Name _____ Date _____

5. How many cents ($0.01) does it cost to make one Cat's Eye Marble? Why?

_____

6. What happens to the number that shows the cost?

_____

7. When you divide by 0.01, does each digit shift to the right or left? Why?

_____

8. How many places does each digit shift? Why?

_____

9. How many tenths of a cent ($0.001) does it cost to make one Cat's Eye Marble?

_____

10. What happens to the number that shows the cost?

_____

11. When you divide by 0.001, does each digit shift to the right or left? Why?

_____

12. How many places does each digit shift? Why?

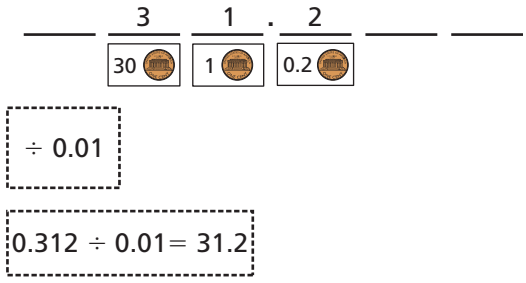
_____

13. Compare the shift pattern in this lesson with the shift pattern in Lesson 18. Is the shift pattern for dividing by decimals the same when the product (dividend) is a decimal number as when the product (dividend) is a whole number? Why or why not?

_____

_____

_____



4–19 Class Activity

Name Date

▶ Change Decimal Divisors to Whole Numbers

What happens when there are two decimal numbers? We can use the same strategy as before, changing the divisor to a whole number.

Discuss each step used to find 0.06 ÷ 0.2.

Understand the Division Problem

Step 1: We know we can write 0.06 ÷ 0.2 as a fraction: → $0.06 \div 0.2 = \frac{0.06}{0.2}$

Step 2: We can make an equivalent fraction with a whole number divisor by multiplying the numerator and denominator by 10. Now we divide 0.6 by 2. → $\frac{0.06 \times 10}{0.2 \times 10} = \frac{0.6}{2} = 2\overline{)0.6}$

14. Why does 0.06 ÷ 0.2 give the same answer as 0.6 ÷ 2?

Solve With Long Division

Step 1: We can show this multiplication by 10 in a long division problem. First, we set up the problem: → $0.2\overline{).06}$

Step 2: Then we multiply both numbers by 10, which moves the decimal points one place to the right. We add zeros if necessary: → $0.2\overline{)\,.0.6}$

Step 3: We don't have to draw arrows. The caret (^) shows where each "new" decimal point belongs. Now we divide 0.6 by 2, just as we did with equivalent fractions. → $0.2\overline{)\,.0^{\wedge}6}$

15. Why does moving both decimal points the same number of places give us the same answer?

Name _____ Date _____

16. How would you solve 0.06 ÷ 0.02 with long division? What number do you need to multiply by to make 0.02 a whole number?

$0.02\overline{)0.06}$

17. How would you solve 0.06 ÷ 0.002 with long division? What number do you need to multiply by to make 0.002 a whole number?

$0.002\overline{)0.06}$

Solve each division problem. Show your work.

18. $0.9\overline{)7.2}$ **19.** $0.04\overline{)0.364}$ **20.** $0.6\overline{)0.372}$ **21.** $0.14\overline{)7.28}$

22. A sand and gravel company has 12.6 tons of gravel to haul today. Each truck can carry 0.9 ton of gravel. How many trucks will be needed?

23. Mountain climbers are climbing a trail that is 3.15 miles long. They can climb about 0.45 mile a day. How many days will it take them to reach the top?

4–19 Going Further

Name _____ Date _____

Vocabulary
divisible
even
odd

▶ Divisibility Rules for 2, 5, and 10

A number is **divisible** by another number if the remainder is zero when the first number is divided by the second number.

45 is divisible by 5 because the remainder is zero. $5\overline{)45}$ → 9

36 is not divisible by 5 because the remainder is not zero. $5\overline{)36}$ → 7 R1

Here are rules you can use to test for divisibility without dividing.

Rule	Example	Example
A number is divisible by 2 if the ones digit is 0, 2, 4, 6, or 8.	13**6** is divisible by 2.	28**3** is not divisible by 2.
A number is divisible by 5 if the ones digit is 0 or 5.	1,76**0** is divisible by 5.	50**6** is not divisible by 5.
A number is divisible by 10 if the ones digit is 0.	79**0** is divisible by 10.	80**9** is not divisible by 10.

Complete the table. Use a check mark to show divisibility.

		24	65	110	108	137	215
1.	divisible by 2						
2.	divisible by 5						
3.	divisible by 10						

Even numbers are divisible by 2. **Odd** numbers are not divisible by 2.

Answer each question.

4. Write 5 numbers between 50 and 100 that are divisible by 5.

_____

5. If a number is divisible by 10, what other numbers is it divisible by? Why?

_____

6. **On The Back** Challenge: Write numbers that are divisible by 3. Find a pattern and write a rule. Test your rule.

Name _____ Date _____

4–20 Class Activity

Name Date

▶ Place-Value Concepts in Division

Dear Math Students:

Today I am going to the store with my friend to buy some greeting cards that cost 75 cents each. I have $19.50 to spend. I want to know how many greeting cards I can buy. I solved the problem as shown below, but my friend said it was wrong. He said that if you moved the decimal points two places to the right, then both numbers will get bigger and so your answer will be too big. Is he right? Why or why not?

$0.75\overline{)19.50} = 0.75.\overline{)19.50.} = 75\overline{)1,950} = 75\overline{)1,950}$

Thank you.

Puzzled Penguin

1. Write a response to the Puzzled Penguin.

Suppose you know that 1,715 ÷ 35 = 49. Use this to solve each problem.

2. $35\overline{)17.15}$

3. $35\overline{)171.5}$

4. $0.35\overline{)0.1715}$

5. $35\overline{)17,150}$

6. $3.5\overline{)1,715}$

7. $0.35\overline{)1,715}$

8. $3.5\overline{)17.15}$

9. $0.35\overline{)1.715}$

4–20 Class Activity

Name _____ Date _____

▶ Mixed Division Practice

Solve.

Show your work.

10. The Clark family is having a big lawn party. They have 196 chairs, and they want to put 8 chairs at each table. How many chairs will be left over?

_____

11. Liam needs to buy 640 eggs for a soccer breakfast. If eggs come in cartons of 18, how many cartons should he buy?

_____

12. Jacob made $507 this year delivering newspapers. How much money did he make each month?

_____

13. Ms. Uhura is making 12 skating costumes. She has 21 m of ribbon. How much ribbon can she use on each costume?

_____

14. A class trip will cost $358.40. There are 28 students in the class. How much will the trip cost per student?

_____

Name _____ Date _____

Solve.

Show your work.

15. The Ramsey family collects and sells maple syrup. Last month they collected 57.8 liters of syrup. They will pour it into bottles that hold 0.85 of a liter. How many bottles will the Ramseys fill?

_____

16. Kyle spent $22.94 on postage stamps today. Each stamp cost 37 cents ($0.37). How many stamps did Kyle buy?

_____

Solve.

17. $0.6\overline{)54}$ **18.** $0.08\overline{)72}$ **19.** $0.5\overline{)0.45}$ **20.** $0.04\overline{)28}$

21. $9\overline{)65}$ **22.** $0.07\overline{)0.49}$ **23.** $8\overline{)76}$ **24.** $0.05\overline{)34.5}$

25. $7\overline{)395}$ **26.** $0.6\overline{)141}$ **27.** $33\overline{)3{,}028}$ **28.** $0.045\overline{)41.85}$

29. On the Back Write and solve a division problem that uses a whole number and a decimal number.

Name _____ Date _____

Name _____ Date _____

▶ Decimal Multiplication or Decimal Division?

For each problem, decide whether you need to multiply or divide. Then solve.

Show your work.

1. A certain turtle can walk 0.2 mile in one hour. How far can the turtle walk in 12 hours? How far can it walk in 0.5 hour?

2. Gus runs 3.6 miles during running practice. He takes a sip of water for every 0.9 mile that he runs. How many sips does Gus take during his running practice?

3. Every year about 135 of the cows on Dixie's Dairy Farm have calves. This year only 0.6 as many cows had calves. How many cows had calves this year?

4. A box of oatmeal holds 1.2 pounds. Each bowl of oatmeal holds 0.08 pound. How many bowls of oatmeal can you get from a box?

5. A rectangular patio has an area of 131.52 square meters. The width of the patio is 9.6 meters. What is its length?

Name _____ Date _____

▶ Results of Operations With Whole Numbers and Decimal Numbers

In the equations below, *a* and *b* are whole numbers greater than 1, and *d* is a digit so that 0.*d* is a decimal number less than 1. Answer each question.

6. If $b \times a = c$, is c greater or less than a? Why?

7. If $0.d \times a = c$, is c greater or less than a? Why?

8. If $a \div b = c$, is c greater or less than a? Why?

9. If $a \div 0.d = c$, is c greater or less than a? Why?

Answer each question without trying to find the value.

10. Which is greater, 42×356 or $356 \div 42$? How do you know?

Name _____ Date _____

11. Which is greater, 0.65 × 561 or 561 ÷ 0.65? How do you know?

12. Which is greater, 832 ÷ 67 or 832 ÷ 0.67? How do you know?

13. Which is greater, 738 × 66 or 738 × 0.66? How do you know?

▶ Make Predictions

Solve.

Show your work.

14. Farmer Ortigoza has 124.6 acres of land. Farmer Ruben has 0.8 times as much land.

    Does Farmer Ruben have more or less than 124.6 acres? _____

    How many acres does Farmer Ruben have? _____

15. Mee Young has 48 meters of crepe paper. She will cut it into strips that are each 0.6 meter long.

    Will Mee Young get more or fewer than 48 strips? _____

    How many strips will Mee Young get? _____

Name _____ Date _____

Solve.

Show your work.

16. Roberto can lift 115 pounds. His friend Vance can lift 0.9 of that amount.

Can Vance lift more or less than 115 pounds? _____

How many pounds can Vance lift? _____

17. The Daisy Cafe served 18 liters of hot chocolate today. Each serving was in a cup that held 0.2 liter.

Did the cafe serve more or fewer than 18 cups of hot chocolate? _____

How many cups did the cafe serve? _____

▶ Mixed Practice

Solve.

18. $0.5 \times 3 =$ _____ **19.** $0.007 \times 6 =$ _____ **20.** $0.4 \times 0.8 =$ _____

21. $6\overline{)5.1}$ **22.** $4\overline{)22.8}$ **23.** $27\overline{)8.91}$ **24.** $34\overline{)1.564}$

25. $\begin{array}{r} 28 \\ \times\ 0.63 \\ \hline \end{array}$ **26.** $\begin{array}{r} 0.35 \\ \times\ 94 \\ \hline \end{array}$ **27.** $\begin{array}{r} 78.6 \\ \times\ 49 \\ \hline \end{array}$ **28.** $\begin{array}{r} 215 \\ \times\ 37 \\ \hline \end{array}$

29. $0.8\overline{)7.52}$ **30.** $0.03\overline{)0.285}$ **31.** $0.42\overline{)15.12}$ **32.** $1.9\overline{)1.634}$

Name _____ Date _____

33. 0.37×0.09

34. 0.75×0.14

35. 51.3×6.2

36. 4.29×0.27

37. $0.4\overline{)0.156}$

38. $0.13\overline{)689}$

39. $0.57\overline{)55.86}$

40. $0.96\overline{)460.8}$

▶ Mixed Real-World Applications

Solve.

Show your work.

41. The Fox Theater has 19 rows of seats with 26 seats in each row. There are 498 people standing in line to see a movie.

How many people will get in? _____

How many people will have to wait until the next movie? _____

42. Polly bought 12 beach balls for her beach party. She spent $23.64. How much did each beach ball cost?

_____

43. All of the 245 fifth graders at Breezy Point School are going on a trip to the aquarium. Each van can carry 16 students.

How many vans will be needed for the trip? _____

44. Today Aaliyah ran 4.5 miles per hour for three fourths (0.75) of an hour.

How far did Aaliyah run today? _____

45. On the Back Write and solve two word problems involving decimals. One should require multiplication and one should require division.

Name _____ Date _____