Solving Place-Value Riddles

Home Link 2-1

NAME DATE TIME

SRB 66-67

Solve the number riddles.

1. I have 5 digits.
   My 5 is worth 50,000.
   My 8 is worth 8,000.
   One of my 6s is worth 60.
   The other is worth 10 times as much.
   My other digit is a 0.

   What number am I?

   _____

2. I have 5 digits.
   My 9 is worth 9 * 10,000.
   My 2 is worth 2 thousand.
   One of my 7s is worth 70.
   The other is worth 10 times as much.
   My other digit is a 6.

   What number am I?

   _____

3. I have 4 digits.
   My 7 is worth 7 * 1,000.
   My 2 is worth 200.
   One of my 4s is worth 40.
   The other is worth $\frac{1}{10}$ as much.

   What number am I?

   _____

4. I have 6 digits.
   One of my 3s is worth 300,000.
   The other is worth $\frac{1}{10}$ as much.
   My 6 is worth 600.
   The rest of my digits are zeros.

   What number am I?

   _____

5. I have 5 digits.
   My 4s are worth 4 [10,000s] and 4 * 10.
   One of my 3s is worth 3,000.
   The other is worth $\frac{1}{10}$ as much.
   My other digit is a 2.

   What number am I?

   _____

6. I am the largest 7-digit number you can write with the digits 3, 6, 9, 4, 0, 8, and 2.

   What number am I?

   _____

Practice

Solve.

7. $4 * (3 + 2) =$ _____
8. $100 - [(25 / 5) * 10] =$ _____
9. $\{(24 / 6) + (36 / 6)\} + 2 =$ _____
10. $(3 * 5) - (2 * 5) =$ _____
11. $(3 * 7) + (2 * 5) =$ _____
12. $(56 / 7) * (42 / 7) =$ _____

Evaluating Expressions with Exponential Notation

Home Link 2-2

NAME DATE TIME

SRB 68-69, 71

Write each number in standard notation.

1. 10^6 _____
2. $3 * 10^6$ _____
3. 10^3 _____
4. $24 * 10^3$ _____

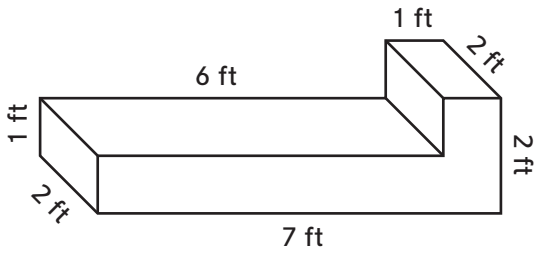
Explain to someone at home how you solved Problems 1–4.

Write each number in standard notation. Then compare them by writing >, <, or = in the box.

Sample	$22 * 10^4$ *220,000*	<	$11 * 10^5$ *1,100,000*
5	$3 * 10^2$		$2 * 10^3$
6	$15 * 10^7$		$2 * 10^8$
7	$10^8 * 27$		$9 * 10^7$

Practice

Jackie wants to ship a box of hockey sticks to a sports camp. She is using the box shown below.



Shipping Rate

$20.00 for up to 10 cubic feet.

Add $1.00 for each cubic foot above 10.

8. What is the volume of the box?

   About _____ cubic feet

9. How much will Jackie pay for shipping? $_____

Solving Problems Using Powers of 10

Home Link 2-3

NAME DATE TIME

SRB 83, 97-98

Use estimation to solve.

Renee is in charge of the school carnival for 380 students. She has 47 boxes of prizes. Each box has 22 prizes. She wants to make sure she has enough prizes for each student to win 2 prizes.

(1) Does Renee have enough prizes? _____

Explain how you solved the problem.

(2) Does Renee have enough prizes for each student to win 3 prizes? _____

Explain.

Practice

Write each number in standard notation.

(3) $42 * 10^6$ _____

(4) $8 * 10^1$ _____

Write each number in exponential notation.

(5) 30,000 _____

(6) 70,000,000 _____

U.S. Traditional Multiplication

Home Link 2-4

NAME DATE TIME

Family Note Today your child began learning a multiplication strategy called U.S. traditional multiplication. This strategy may be familiar to you, as it is the multiplication strategy that many adults learned when they were in school. Your child will be learning to use U.S. traditional multiplication with larger and larger numbers over the next week or two.

U.S. traditional multiplication is often challenging for students to learn. Do not expect your child to use it easily right away. There will be plenty of opportunities for practice throughout the school year.

As your child uses U.S. traditional multiplication to solve the problems below, encourage him or her to check the answers by solving the problems in another way or using an estimate.

SRB 102

Solve each problem using U.S. traditional multiplication. Show your work.

Example:	Multiply the ones: 8 * 3 ones = 24. Write 4 below the line and 2 above the 10s column. Then multiply the tens: 8 * 7 tens = 56 tens. Add the 2 tens from the first step: 56 tens + 2 tens = 58 tens, or 5 hundreds and 8 tens. Write 8 below the line in the 10s column and 5 below the line in the 100s column.

$$\begin{array}{r} {\scriptstyle 2} \\ 73 \\ *\quad 8 \\ \hline 584 \end{array}$$

① $\begin{array}{r} 56 \\ *\quad 6 \\ \hline \end{array}$

② $\begin{array}{r} 96 \\ *\quad 4 \\ \hline \end{array}$

Practice

Write each number in expanded form.

③ 397 _____

④ 1,268 _____

⑤ 4,082 _____

⑥ 29,141 _____

Multiplication Top-It: Larger Numbers

Home Link 2-5

NAME DATE TIME

Make a set of number cards by writing the numbers 0–9 on slips of paper or index cards. Make four of each number card. You can also use the 2–9 cards and the aces from a deck of regular playing cards.

SRB 100, 102, 104

Explain the rules of *Multiplication Top-It: Larger Numbers* to someone at home.

Multiplication Top-It: Larger Numbers

1. Each player draws 4 cards. Use 3 of the cards to make a 3-digit number. Use the other card to make a 1-digit number.
2. Multiply the numbers. Compare your product to the other player's product. The player with the larger product takes all the cards.
3. Keep playing until you run out of cards. The player with more cards wins the game.

To play by yourself: Keep the cards if your product is more than 1,000. Discard the cards if your product is less than 1,000. If you have more than 20 cards at the end of the game, you win.

Use your number cards to play the game with a partner or by yourself. Record two rounds of the game below. Show how you multiplied. Use U.S. traditional multiplication to multiply in at least one round.

(1)

(2)

Practice

Write each power of 10 using exponential notation.

(3) 100 = _____

(4) 10,000 = _____

(5) 100,000,000 = _____

(6) 1,000 = _____

Converting Units

Home Link 2-6

NAME DATE TIME

SRB 215-216

Ask someone at home to help you find the following:

- a 1-cup measuring cup or a coffee mug
- a large bowl
- a stopwatch or clock
- a 12-inch ruler or tape measure
- a food package with a weight given in pounds

1 cup = 8 fluid ounces
1 minute = 60 seconds
1 foot = 12 inches
1 pound = 16 ounces

Use these things to help you answer the questions below.

(1) **a.** Pour cups of water into the large bowl. (A coffee mug holds about 1 cup of water.) How many cups of water does it take to fill the bowl?

_____ cups

b. Convert your measurement to fluid ounces. _____ fluid ounces

(2) **a.** Time or estimate how long it takes you to walk around your block in minutes.

_____ minutes

b. Convert your measurement to seconds. _____ seconds

(3) **a.** Measure the length of your bed to the nearest foot. _____ feet

b. Convert your measurement to inches. _____ inches

(4) **a.** Record the weight on the food package in pounds. _____ pounds

b. Convert the weight to ounces. _____ ounces

Practice

Make an estimate. Then solve using U.S. traditional multiplication. Show your work. Use your estimate to check that your answer makes sense.

(5) 358 * 8 = ?

Estimate: _____

```
  3 5 8
*     8
-------
```

(6) 377 * 4 = ?

Estimate: _____

```
  3 7 7
*     4
-------
```

Estimating and Multiplying

Home Link 2-7

NAME DATE TIME

SRB 83, 100-104

Make an estimate for each multiplication problem. Write a number sentence to show how you estimated.

Then solve ONLY the problems that have answers that are *more than 1,000.* Use your estimates to help you decide which problems to solve.

Use U.S. traditional multiplication to solve at least one of the problems. Show your work.

① $23 * 41 = ?$

$20 * 40 = 800$

(estimate)

$$\begin{array}{r} 23 \\ *\ 41 \\ \hline \end{array}$$

② $72 * 56 = ?$

_____

(estimate)

$$\begin{array}{r} 72 \\ *\ 56 \\ \hline \end{array}$$

③ $32 * 15 = ?$

_____

(estimate)

$$\begin{array}{r} 32 \\ *\ 15 \\ \hline \end{array}$$

④ $82 * 11 = ?$

_____

(estimate)

$$\begin{array}{r} 82 \\ *\ 11 \\ \hline \end{array}$$

⑤ $63 * 39 = ?$

_____

(estimate)

$$\begin{array}{r} 63 \\ *\ 39 \\ \hline \end{array}$$

⑥ $91 * 46 = ?$

_____

(estimate)

$$\begin{array}{r} 91 \\ *\ 46 \\ \hline \end{array}$$

Practice

Solve.

⑦ **a.** $7 * 10{,}000 =$ _____

b. $7 * 10^4 =$ _____

⑧ **a.** $2 * 400 =$ _____

b. $2 * 4 * 10^2 =$ _____

⑨ **a.** $6{,}000 * 300 =$ _____

b. $6 * 10^3 * 3 * 10^2 =$ _____

Choosing Multiplication Strategies

Home Link 2-8

NAME DATE TIME

Choose one problem to solve using U.S. traditional multiplication. Solve the other problems using any strategy. Try to choose strategies that are accurate and efficient. Show your work.

SRB 83, 100-104

① 198 * 25 = ?

_____
(estimate)

② 642 * 207 = ?

_____
(estimate)

③ 420 * 41 = ?

_____
(estimate)

198 * 25 = _____ 642 * 207 = _____ 420 * 41 = _____

④ The distance from Chicago, Illinois, to Boston, Massachusetts, by plane is 851 miles. A pilot flew from Chicago to Boston 37 times in one year. How many miles was that?

Estimate: _____

Answer: _____ miles

⑤ It takes 246 floor tiles to cover the floor of a classroom. There are 31 same-size classrooms in the school. How many floor tiles does it take to cover all the classroom floors?

Estimate: _____

Answer: _____ floor t iles

⑥ Explain to someone at home which strategy you used to solve each problem and why.

Practice

Solve.

⑦ **a.** 5 * 300,000 = _____ **b.** $5 * 3 * 10^5$ = _____

⑧ **a.** 40 * 6,000 = _____ **b.** $4 * 10 * 6 * 10^3$ = _____

⑨ **a.** 20,000 * 700 = _____ **b.** $2 * 10^4 * 7 * 10^2$ = _____

Using Multiples of 10 to Estimate

Home Link 2-9

NAME DATE TIME

(1) Estimate about how many meters Martin swims in June if he swims about 200 meters per day. There are 30 days in June. Show how you made your estimate.

SRB 97-98

About _____ meters

(2) Estimate how many days it would take Martin to swim 60,000 meters. Show how you made your estimate.

About _____ days

Practice

Make an estimate and solve.

(3) 107 * 19 = ?

Estimate: _____

$$\begin{array}{r} 107 \\ \times\ \ 19 \\ \hline \end{array}$$

(4) 86 * 975 = ?

Estimate: _____

$$\begin{array}{r} 975 \\ \times\ \ 86 \\ \hline \end{array}$$

Mental Division Practice

Home Link 2-10

NAME DATE TIME

Use multiplication and division facts to solve the following problems mentally.
Remember: Write an equivalent name for the dividend by breaking it into smaller parts that are easier to divide.

SRB 72, 107

Example: 72 divided by 4

- Write some multiples of 4: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40
- Write an equivalent name by breaking 72 into smaller numbers that are multiples of 4.
  Equivalent name for 72: 40 + 32
- Use the equivalent name to divide mentally.
  Ask yourself: *How many 4s are in 40?* (10) *How many 4s are in 32?* (8)
  Think: *How many total 4s are in 72?* (10 [4s] + 8 [4s] = 18 [4s], so 72 ÷ 4 = 18)

(1) 57 ÷ 3 → ?

Multiples of 3: _____

_____

Equivalent name for 57:

_____

57 ÷ 3 → _____

(2) 96 ÷ 8 → ?

Multiples of 8: _____

_____

Equivalent name for 96:

_____

96 ÷ 8 → _____

Practice

Make an estimate and solve.

(3) 68 * 23

Estimate: _____

```
   6 8
*  2 3
-------
```

(4) 278 * 15

Estimate: _____

```
   2 7 8
*    1 5
---------
```

Division

Home Link 2-11

NAME DATE TIME

Read the example of how to use partial-quotients division with multiples of the divisor.

SRB 84, 108-110

11)237		Think: *How many 11s are in 237?* You know 20 ∗ 11 is 220, so
− 220	20	there are at least 20 [11s]. Write 20 as your first partial quotient and 220 below 237.
17		Subtract. 17 is left to divide.
− 11	1	Think: *How many 11s are in 17?* 1, so 1 is the next partial quotient. Write 11 below 17.
6	21	Subtract. 6 is left to divide. 6 is less than 11, so we are done dividing.
↑	↑	Add the partial quotients. 20 + 1 = 21

Remainder Quotient Answer: 21 R6

(1) You could have started solving the example problem by taking away 110 from 237. If this was your first step, what would have been the first partial quotient, and why?

_____

In Problems 2 and 3, make an estimate.
Then divide using partial-quotients division.

(2) Estimate: _____

15)485

Answer: _____

(3) Estimate: _____

17)408

Answer: _____

Practice

Multiply using U.S. traditional multiplication. Show your work on the back of this page.

(4) 751 ∗ 3 = ?

Estimate: _____

Answer: _____

(5) 86 ∗ 94 = ?

Estimate: _____

Answer: _____

Division with Multiples

Home Link 2-12

NAME DATE TIME

Here is how to use partial-quotients division with a list of multiples to solve 2,106 / 19.

First, list some multiples of 19:

100 * 19 = 1,900
50 * 19 = 950
20 * 19 = 380
10 * 19 = 190
5 * 19 = 95

Next, use the multiples to help you choose partial quotients.

19)2,106	
−1,900	100
206	
− 190	10
16	110
↑	↑
Remainder	**Quotient**

Think: *Are there at least 100 [19s] in 2,106?* Yes, 100 * 19 = 1,900. Use 100 as your first partial quotient.

Subtract. 206 is left to divide.

Think: *Are there at least 10 [19s] in 206?* Yes, 10 * 19 = 190. *Are there at least 20 [19s] in 206?* No, 20 * 19 = 380. So use 10 as the next partial quotient.

Subtract. 16 is left. 16 is less than 19, so you are done dividing. Add the partial quotients: 100 + 10 = 110

Answer: 110 R16

Complete the list of multiples below. Then use it to help you solve 1,954 / 18.

① 100 * _____ = _____
50 * _____ = _____
20 * _____ = _____
10 * _____ = _____
5 * _____ = _____
2 * _____ = _____

② 1,954/18 → ?

Estimate: _____

18)1,954

Answer: _____

Practice

Divide using partial-quotients division. Show your work on the back of this page.

③ 931 / 12 → ?

Estimate: _____

Answer: _____

④ 716 / 21 → ?

Estimate: _____

Answer: _____

Division Number Stories with Remainders

Home Link 2-13

NAME DATE TIME

Create a mathematical model for each problem. Solve the problem and show your work. Explain what you did with the remainder.

SRB 12-14, 113

(1) Pizzas cost $14 dollars each. How many pizzas can you buy with $60? Quotient: _____ Remainder: _____ Answer: I can buy _____ pizzas. Circle what you did with the remainder. Ignored it Rounded the quotient up Why? _____ _____	Mathematical model:
(2) Your classroom received 150 books. You are placing them in bins. Each bin holds 20 books. How many bins do you need? Quotient: _____ Remainder: _____ Answer: I need _____ bins. Circle what you did with the remainder. Ignored it Rounded the quotient up Why? _____ _____	Mathematical model:

Practice

Divide using partial quotients. Then make an estimate to check whether your answer makes sense. Show your work on the back of this page.

(3) 190 ÷ 15 → _____

Estimate: _____

(4) 427 ÷ 30 → _____

Estimate: _____