Place the First Digit

When you divide, you can use estimation or place value to place the first digit of the whole-number quotient.

Divide.

$6\overline{)1{,}266}$

- Estimate. 1,200 ÷ 6 = 200, so the first digit of the whole-number quotient is in the hundreds place.
- Divide the hundreds.
- Divide the tens.
- Divide the ones.

So, 1,266 ÷ 6 = 211.

Since 211 is close to the estimate, 200, the answer is reasonable.

```
  211
6)1,266
 −12↓|
  06 |
 −6  |
  06 |
 −6  |
   0
```

Divide.

8,895 ÷ 8

- Use place value to place the first digit.
- Look at the first digit.
  If the first digit is less than the divisor, then the first digit of the whole-number quotient will be in the hundreds place.
  If the first digit is greater than or equal to the divisor, then the first digit of the whole-number quotient will be in the thousands place.
- Since 8 thousands can be shared among 8 groups, the first digit of the whole-number quotient will be in the thousands place. Now divide.

So, 8,895 ÷ 8 is 1,111 r7.

```
1,111 r7
8)8,895
 −8↓|||
  08|||
 −8 |||
   09||
  −8↓||
    15|
   −8|
    7
```

Divide.

1. $3\overline{)627}$

2. $5\overline{)7{,}433}$

3. $4\overline{)5{,}367}$

4. $9\overline{)6{,}470}$

5. $8\overline{)2{,}869}$

6. $6\overline{)1{,}299}$

7. $4\overline{)893}$

8. $7\overline{)4{,}418}$

Name _____

Find the Quotient

Use the clue to write and solve a number sentence for each exercise. Choose the dividend from a number in the circles and the divisor from a number in the triangles. You can use the number in each circle only once, but you can use the number in a triangle more than once. The correct number sentence will not contain a remainder.

1. Find the least quotient.

_____

2. Find the greatest quotient.

_____

3. Find the quotient closest to 700.

_____

4. Find a 3-digit quotient with a 4 in the ones place.

_____

5. Find a quotient of 1,675.

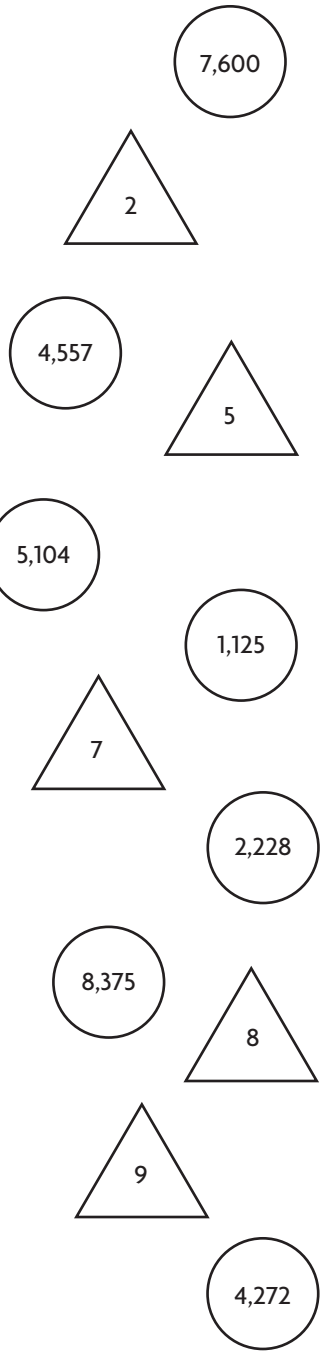
_____

6. Find the least quotient that ends with a 2.

_____

7. Find the quotient closest to 1,100.

_____



Name _____

Divide by 1-Digit Divisors

You can use compatible numbers to help you place the first digit in the whole-number quotient. Then you can divide and check your answer.

Divide. $4\overline{)757}$

Step 1 Estimate with compatible numbers to decide where to place the first digit.

$757 \div 4$

$\downarrow$

$800 \div 4 = 200$

The first digit of the whole-number quotient is in the hundreds place.

Step 2 Divide.

$$\begin{array}{r} 189 \text{ r1} \\ 4\overline{)757} \\ -4\downarrow \\ \hline 35 \\ -32\downarrow \\ \hline 37 \\ -36 \\ \hline 1 \end{array}$$

Step 3 Check your answer.

		whole-number
189	←	quotient
× 4	←	divisor
756		
+ 1	←	remainder
757	←	dividend

Since 189 is close to the estimate of 200, the answer is reasonable.

So, $757 \div 4$ is 189 r1.

Divide. Check your answer.

1. $8\overline{)136}$

2. $7\overline{)297}$

3. $5\overline{)8{,}126}$

4. $7\overline{)4{,}973}$

5. $3\overline{)741}$

6. $7\overline{)456}$

Name _____

Division Detective

For each exercise below, find the unknown number that belongs in each box. Not all boxes will need a number.

1. $7\overline{)287}$ quotient $4\square$	**2.** $3\overline{)18\square}$ quotient $\square 2$	**3.** $\square\overline{)44\square}$ quotient $55\square$
4. $9\overline{)11\square}$ quotient $1\square$ r4	**5.** $\square\overline{)3\square 5}$ quotient 40 r5	**6.** $2\overline{)4,4\square 9}$ quotient $2,20\square$ r1
7. $7\overline{)\square 4\ 1}$ quotient $4\square$ r5	**8.** $\square\overline{)73\ 5\square}$ quotient $36\square$ r1	**9.** $3\overline{)5,8\ 7\ 2}$ quotient $1,9\square 7$ r$\square$
10. $4\overline{)6,1\square\square}$ quotient $1,5\ 2\ 9$ r2	**11.** $\square\overline{)7,6\ 6\ 2\square}$ quotient $2,5\square 4$	**12.** $4\overline{)\square\square 5}$ quotient $5\ 3$ r3
13. $6\overline{)\square,93\ 5}$ quotient $1,\ 48\square$ r1	**14.** $\square\overline{)1,225\square}$ quotient 245	**15.** $7\overline{)5\square 9}$ quotient $\square 8$ r3

16. Write Math **Explain** the strategy you used to solve Exercise 1.

_____

_____

_____

_____

_____

_____

17. Stretch Your Thinking **Explain** how you would solve a division problem with an unknown divisor.

_____

_____

_____

_____

_____

_____

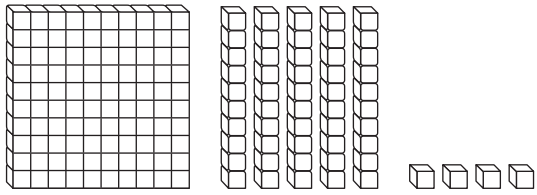
Name _____

Division with 2-Digit Divisors

You can use base-ten blocks to model division with 2-digit divisors.

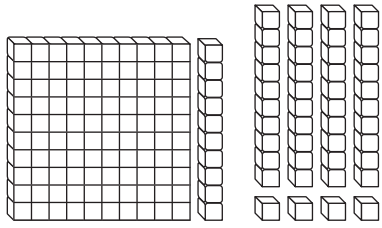
Divide. 154 ÷ 11

Step 1 Model 154 with base-ten blocks.



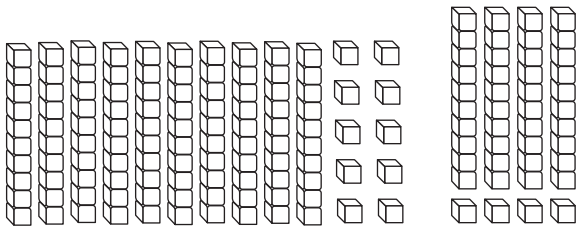
Step 2 Make equal groups of 11. Each group should contain 1 ten and 1 one.

You can make 4 groups of 11 without regrouping.



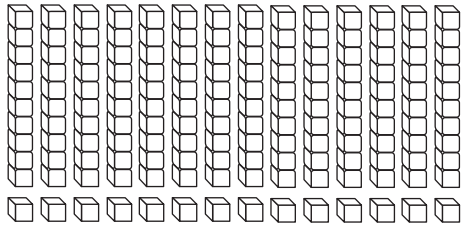
Step 3 Regroup 1 hundred as 10 tens.

Regroup 1 ten as 10 ones.



Step 4 Use the regrouped blocks to make as many groups of 11 as possible. Then count the total number of groups.

There are 14 groups. So, 154 ÷ 11 = 14.



Divide. Use base-ten blocks.

1. 192 ÷ 12 _____

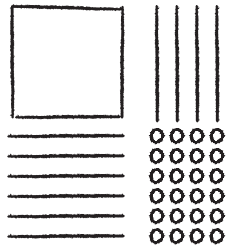
2. 182 ÷ 14 _____

Name _____

Dividing It Up

Write two related division sentences for each quick picture.

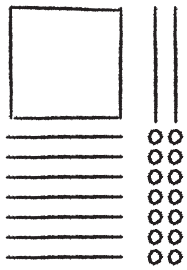
1.



_____

_____

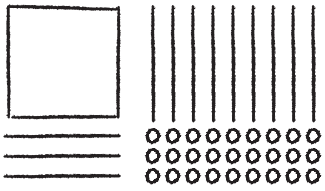
2.



_____

_____

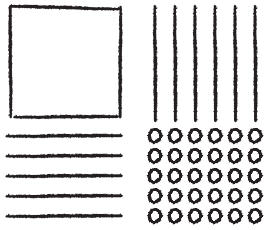
3.



_____

_____

4.



_____

_____

5. Write Math **Explain** how you can use multiplication to check that your division sentences for Exercises 1–4 are correct.

_____

_____

_____

_____

Partial Quotients

Divide. Use partial quotients.

858 ÷ 57

		Quotient
Step 1 Estimate the number of groups of 57 that are in 858. You know 57 × 10 = 570. Since 570 < 858, at least 10 groups of 57 are in 858. Write 10 in the quotient column, because 10 groups of the divisor, 57, are in the dividend, 858.	858 −570 288	10
Step 2 Now estimate the number of groups of 57 that are in 288. You know 60 × 4 = 240. So at least 4 groups of 57 are in 288. Subtract 228 from 288, because 57 × 4 = 228. Write 4 in the quotient column, because 4 groups of the divisor, 57, are in 288.	288 −228 60	4
Step 3 Identify the number of groups of 57 that are in 60. 57 × 1 = 57, so there is 1 group of 57 in 60. Write 1 in the quotient column.	60 −57 remainder → 3	+ 1 15
Step 4 Find the total number of groups of the divisor, 57, that are in the dividend, 858, by adding the numbers in the quotient column. Include the remainder in your answer.		**Answer:** 15 r3

Divide. Use partial quotients.

1. $17\overline{)476}$

2. $14\overline{)365}$

3. $25\overline{)753}$

4. 462 ÷ 11

5. 1,913 ÷ 47

6. 1,085 ÷ 32

Name _____

Partial Quotients Matching

Each division problem below can be solved using two partial quotients. Match each division problem with two partial quotients and with its answer.

	Partial Quotients	Answer
1. $56\overline{)674}$	15	16 r44
	20	
2. $63\overline{)1{,}732}$	10	12 r2
	5	
3. $37\overline{)2{,}434}$	1	27 r31
	7	
4. $49\overline{)828}$	60	65 r29
	2	

Name _____

Estimate with 2-Digit Divisors

You can use *compatible numbers* to estimate whole-number quotients. Compatible numbers are numbers that are easy to compute mentally.

To find two estimates with compatible numbers, first round the divisor. Then list multiples of the rounded divisor until you find the two multiples that are closest to the dividend. Use the one less than and the one greater than the dividend.

Use compatible numbers to find two estimates. 4,125 ÷ 49

Step 1 Round the divisor to the nearest ten.
49 rounds to 50.

Step 2 List multiples of 50 until you get the two closest to the dividend, 4,125.
Some multiples of 50 are:
500 1,000 1,500 2,000 2,500 3,000 3,500 4,000 4,500
4,000 and 4,500 are closest to the dividend.

Step 3 Divide the compatible numbers to estimate the whole-number quotient.
4,000 ÷ 50 = 80 4,500 ÷ 50 = 90

The more reasonable estimate is 4,000 ÷ 50 = 80,
because 4,000 is closer to 4,125 than 4,500 is.

Use compatible numbers to find two estimates.

1. $42\overline{)1{,}578}$

2. $73\overline{)4{,}858}$

3. $54\overline{)343}$

4. 4,093 ÷ 63

5. 4,785 ÷ 79

6. 7,459 ÷ 94

Use compatible numbers to estimate the whole-number quotient.

7. 847 ÷ 37

8. 6,577 ÷ 89

9. 218 ÷ 29

Name _____

Alphabet Estimation

Find two sets of compatible numbers for each problem. Write the letters of your answers on the lines provided.

1.	$87\overline{)6{,}066}$	_____	(A) 2,800 ÷ 70	(Q) 4,000 ÷ 80
2.	$74\overline{)3{,}227}$	_____	(B) 1,800 ÷ 30	(R) 3,500 ÷ 70
3.	$62\overline{)4{,}635}$	_____	(C) 2,400 ÷ 40	(S) 1,400 ÷ 70
4.	$94\overline{)7{,}542}$	_____	(D) 1,400 ÷ 20	(T) 7,200 ÷ 90
5.	$44\overline{)3{,}521}$	_____	(E) 6,300 ÷ 90	(U) 3,600 ÷ 40
6.	$31\overline{)1{,}929}$	_____	(F) 6,400 ÷ 80	(V) 5,600 ÷ 80
7.	$47\overline{)3{,}255}$	_____	(G) 4,800 ÷ 80	(W) 3,600 ÷ 90
8.	$75\overline{)6{,}000}$	_____	(H) 4,800 ÷ 60	(X) 4,200 ÷ 60
9.	$83\overline{)4{,}300}$	_____	(I) 3,000 ÷ 50	(Y) 1,200 ÷ 20
10.	$29\overline{)1{,}433}$	_____	(J) 2,700 ÷ 90	(Z) 2,100 ÷ 70
11.	$19\overline{)1{,}274}$	_____	(K) 2,800 ÷ 40	(AA) 5,600 ÷ 70
12.	$65\overline{)1{,}681}$	_____	(L) 1,500 ÷ 30	(BB) 5,400 ÷ 90
13.	$36\overline{)2{,}281}$	_____	(M) 8,100 ÷ 90	(CC) 2,700 ÷ 90
14.	$92\overline{)2{,}899}$	_____	(N) 3,500 ÷ 50	(DD) 3,200 ÷ 40
15.	$88\overline{)2{,}000}$	_____	(O) 1,200 ÷ 30	(EE) 1,800 ÷ 90
16.	$72\overline{)5{,}525}$	_____	(P) 2,100 ÷ 30	(FF) 4,900 ÷ 70

17. Stretch Your Thinking Which letters have a whole-number quotient of 70? Which letters have a whole-number quotient of 80?

_____

_____

_____

18. Write Math Write a division problem that has a 2-digit divisor and estimated whole-number quotients of 50 and 60.

_____

_____

_____

Name _____

Divide by 2-Digit Divisors

When you divide by a 2-digit divisor, you can use estimation to help you place the first digit in the whole-number quotient. Then you can divide.

Divide. $53\overline{)2{,}369}$

Step 1 Use compatible numbers to estimate the whole-number quotient. Then use the estimate to place the first digit in the whole-number quotient.

$$\begin{array}{r} 40 \\ 50\overline{)2{,}000} \end{array}$$

The first digit will be in the tens place.

Step 2 Divide the tens.

$$\begin{array}{r} 4 \\ 53\overline{)2{,}369} \\ -\ 212 \\ \hline 24 \end{array}$$

Think:

Divide: 236 tens ÷ 53

Multiply: 53 × 4 tens = 212 tens

Subtract: 236 tens − 212 tens

Compare: 24 < 53, so the first digit of the whole-number quotient is reasonable.

Step 3 Bring down the 9 ones. Then divide the ones.

$$\begin{array}{r} 44\ \text{r}37 \\ 53\overline{)2{,}369} \\ -\ 212\downarrow \\ \hline 249 \\ -\ 212 \\ \hline 37 \end{array}$$

Think:

Divide: 249 ones ÷ 53

Multiply: 53 × 4 ones = 212 ones

Subtract: 249 ones − 212 ones

Compare: 37 < 53, so the second digit of the whole-number quotient is reasonable.

Write the remainder to the right of the whole number part of the whole-number quotient.

So, 2,369 ÷ 53 is 44 r37.

Divide. Check your answer.

1. $52\overline{)612}$

2. $63\overline{)917}$

3. $89\overline{)1{,}597}$

4. $43\overline{)641}$

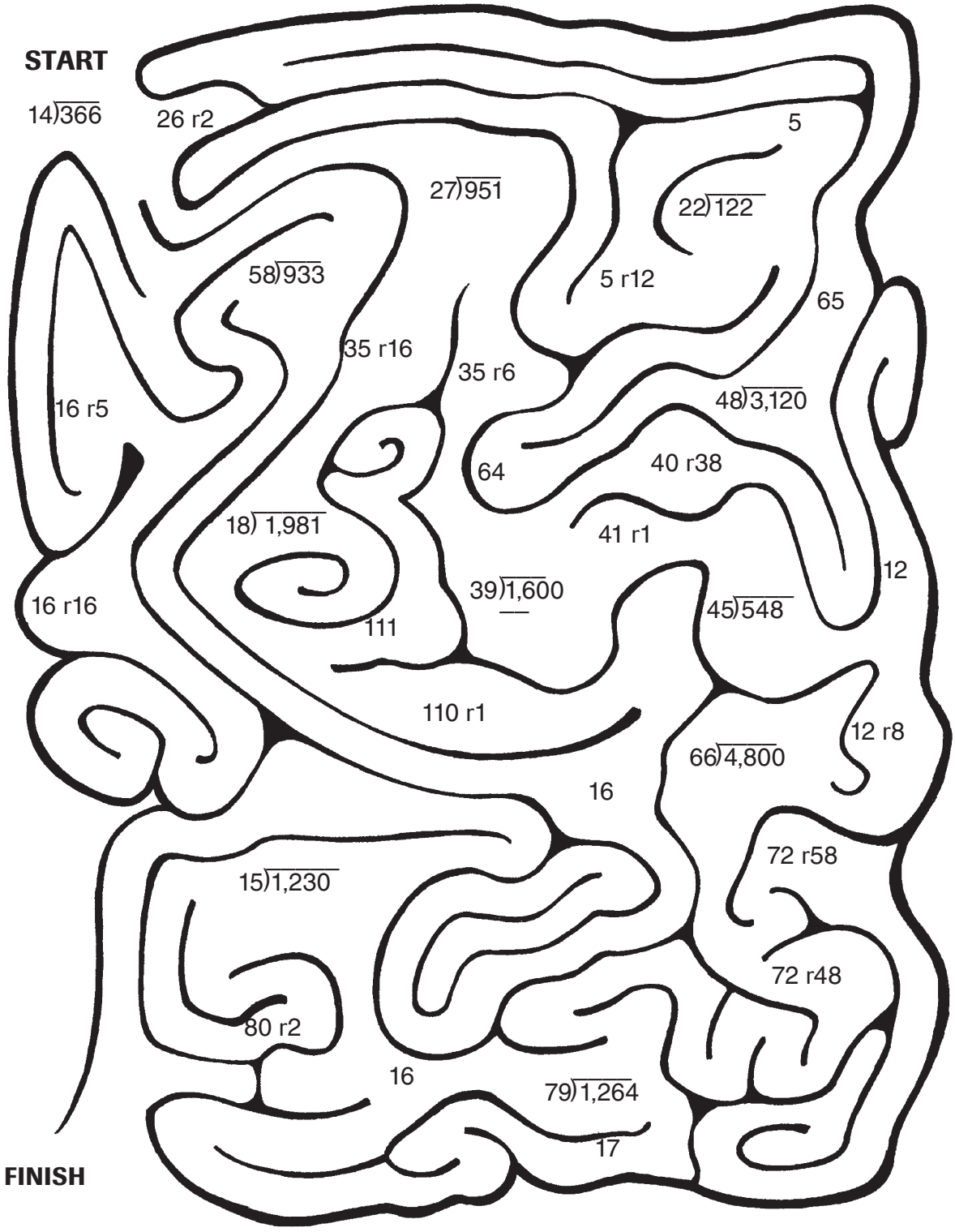
5. $27\overline{)4{,}684}$

6. $64\overline{)8{,}455}$

Name _____

A-Mazing Division

Solve each division problem, beginning at START. Draw a line from the problem to the correct whole-number quotient. Continue until you reach FINISH. If you reach a dead end, go back and try again.



Name _____

Interpret the Remainder

Erin has 87 ounces of trail mix. She puts an equal number of ounces in each of 12 bags. How many ounces does she put in each bag?

$$\begin{array}{r} 7\ \text{r}3 \\ 12\overline{)87} \\ -84 \\ \hline 3 \end{array}$$

First, divide to find the whole-number quotient and remainder. Then, decide how to use the whole-number quotient and the remainder to answer the question.

- The dividend, 87, represents the total number of ounces of trail mix.
- The divisor, 12, represents the total number of bags.
- The whole-number quotient, 7, represents the whole-number part of the number of ounces in each bag.
- The remainder, 3, represents the number of ounces left over.

Divide the 3 ounces in the remainder by the divisor, 12, to write the remainder as a fraction: $\frac{3}{12}$

Write the fraction part in simplest form in your answer.

So, Erin puts $7\frac{1}{4}$ ounces of trail mix in each bag.

Interpret the remainder to solve.

1. Harry goes on a canoe trip with his scout troop. They will canoe a total of 75 miles and want to travel 8 miles each day. How many days will they need to travel the entire distance?

_____

2. Hannah and her family want to hike 8 miles per day along a 125-mile-long trail. How many days will Hannah and her family hike exactly 8 miles?

_____

3. There are 103 students eating lunch in the cafeteria. Each table seats 4 students. All the tables are full, except for one table. How many students are sitting at the table that is not full?

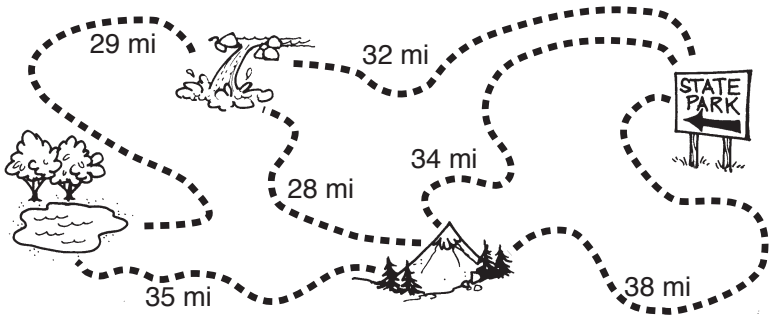
_____

4. Emily buys 240 square feet of carpet. She can convert square feet to square yards by dividing the number of square feet by 9. How many square yards of carpet did Emily buy? (Hint: Write the remainder as a fraction.)

_____

Biking Division

Jeff and Mario spent their summer vacation biking and camping along trails in a nearby state park. Use the map and the table of information below to solve each problem.



Distance, Rate, and Time	
Example: Joe drove 140 miles in 2 hours at 70 miles per hour.	
rate × time = distance	70 × 2 = 140 mi
distance ÷ time = rate	140 ÷ 2 = 70 mi per hr
distance ÷ rate = time	140 ÷ 70 = 2 hr

1. Mario bikes at a rate of 7 miles per hour. If he takes the longer direct route from the park entrance to the mountain, for how many complete hours will Mario bike?

_____

2. If he continues riding at a rate of 7 miles per hour, how many hours will it take Mario to bike from the mountain to the lake along the most direct route?

_____

3. Jeff bikes at a rate of 9 miles per hour. If he bikes the most direct route from the park entrance to the waterfall, about how many hours will Jeff bike?

_____

4. From the waterfall, Jeff then bikes the direct route to the lake. His rate decreases to 8 miles per hour. For how many complete hours will Jeff bike?

_____

5. How many total miles does Jeff bike in order to go from the park entrance to the lake using the shortest distance?

_____

6. Mario bikes along the most direct route from the lake to the waterfall to meet Jeff. If he bikes 5 miles per hour, about how many hours will he bike?

_____

Name _____

Adjust Quotients

When you divide, you can use the first digit of your estimate as the first digit of your whole-number quotient. Sometimes the first digit will be too high or too low. Then you have to adjust the whole-number quotient by increasing or decreasing the first digit.

Estimate Too High		Estimate Too Low	
Divide. 271 ÷ 48 **Estimate.** 300 ÷ 50 = 6		**Divide.** 2,462 ÷ 27 **Estimate.** 2,400 ÷ 30 = 80	
Try 6 ones. $\begin{array}{r} 6 \\ 48\overline{)271} \\ -\ 288 \end{array}$ You cannot subtract 288 from 271. So, the estimate is too high.	Try 5 ones. $\begin{array}{r} 5\text{ r}31 \\ 48\overline{)271} \\ -\ 240 \\ \hline 31 \end{array}$ So, 271 ÷ 48 is 5 r31.	Try 8 tens. $\begin{array}{r} 8 \\ 27\overline{)2{,}462} \\ -\ 216 \\ \hline 30 \end{array}$ 30 is greater than the divisor. So, the estimate is too low.	Try 9 tens. $\begin{array}{r} 91\text{ r}5 \\ 27\overline{)2{,}462} \\ -\ 243 \\ \hline 32 \\ -\ 27 \\ \hline 5 \end{array}$ So, 2,462 ÷ 27 is 91 r5.

Adjust the estimated digit in the whole-number quotient, if needed. Then divide.

1. $58\overline{)1{,}325}$ (2)

2. $37\overline{)241}$ (6)

3. $29\overline{)2{,}276}$ (8)

Divide.

4. $16\overline{)845}$

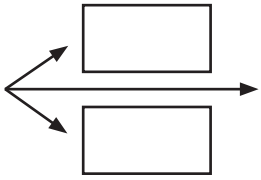
5. $24\overline{)217}$

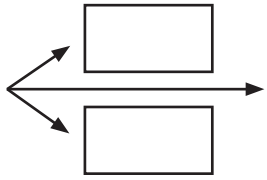
6. $37\overline{)4{,}819}$

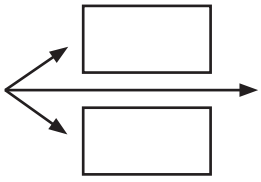
Name _____

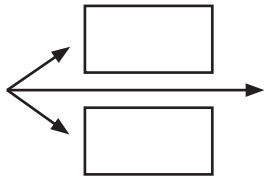
Quotient Correction

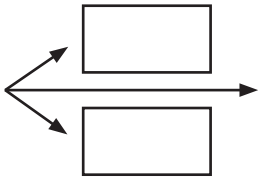
For each problem, find two estimates. Write the higher estimate in the top box and write the lower estimate in the bottom box. Use one estimate to place the first digit. Divide and adjust the whole-number quotient as needed. Write your answer on the line provided.

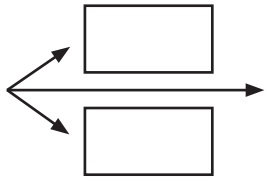
1. $6\overline{)3{,}387}$  _____

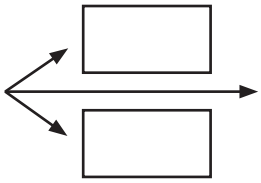
2. $9\overline{)1{,}346}$  _____

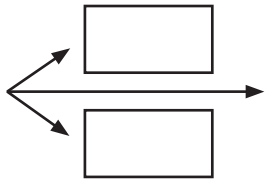
3. $77\overline{)400}$  _____

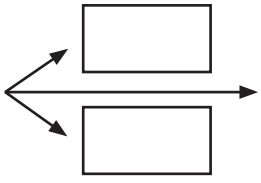
4. $41\overline{)296}$  _____

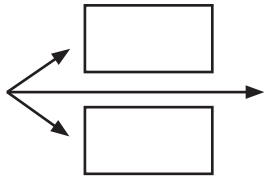
5. $92\overline{)378}$  _____

6. $3\overline{)4{,}509}$  _____

7. $28\overline{)1{,}255}$  _____

8. $50\overline{)729}$  _____

9. $84\overline{)2{,}550}$  _____

10. $32\overline{)656}$  _____

11. Write Math **Explain** the strategy you used to solve Exercise 2.

_____

_____

_____

_____

Name _____

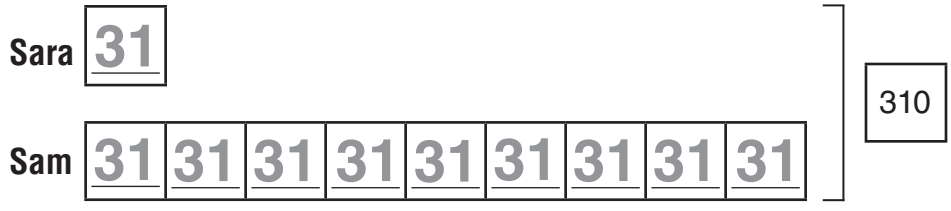
Problem Solving • Division

Sara and Sam picked apples over the weekend. Sam picked nine times as many apples as Sara. Together, they picked 310 apples. How many apples did each person pick?

Read the Problem		
What do I need to find? I need to find the number of apples each person picked.	**What information do I need to use?** I need to know that Sam and Sara picked a total of 310 apples. I need to know that Sam picked 9 times as many apples as Sara.	**How will I use the information?** I can use the strategy draw a diagram to organize the information. I can draw and use a bar model to write the division problem that will help me find the number of apples Sam and Sara each picked.

Solve the Problem

My bar model needs to have one box for the number of apples Sara picked and nine boxes for the number of apples Sam picked. I can divide the total number of apples picked by the total number of boxes.



$$10\overline{)310} \quad 31$$
$$-30$$
$$10$$
$$-10$$
$$0$$

So, Sara picked 31 apples and Sam picked 279 apples.

Solve each problem. To help, draw a bar model on a separate sheet of paper.

1. Kai picked 11 times as many blueberries as Nico. Together, they picked 936 blueberries. How many blueberries did each boy pick?

2. Jen wrote 10 times as many pages of a school report as Tom. They wrote 396 pages altogether. How many pages did each student write?

Name _____

Division Draw

Draw a bar model to solve each problem.

1. Keira, Larry, and Gita picked apples at an orchard. Keira picked twice as many pounds as Larry and 3 times as many pounds as Gita. The total weight of the apples they picked was 8,360 pounds. How many pounds of apples did each person pick?

Keira _____

Larry _____

Gita _____

2. Mark orders food for a restaurant. He orders 5 times the number of pounds of chicken as he does beef, and he orders 4 times the number of pounds of fish as beef. The total weight of the food he orders is 3,600 pounds. How many pounds of each item does Mark order?

chicken _____

beef _____

fish _____

3. Write Math Describe how you used a bar model to solve Problem 1.

_____

_____

_____

_____

_____

_____