Name _____

Multiplying Multiples of Ten

R 6-1

You can multiply with mental math by using basic facts and patterns.

Example A: $5 \times 5 = 25$

$5 \times 5\mathbf{0} = 25\mathbf{0}$

$5\mathbf{0} \times 5\mathbf{0} = 2{,}5\mathbf{00}$

$5\mathbf{0} \times 5{,}\mathbf{000} = 25\mathbf{0},\mathbf{000}$

The product contains the number of zeros in each factor.

Example B: $5 \times 6 = 30$

$5 \times 6\mathbf{0} = 3\mathbf{0}$

$5\mathbf{0} \times 6\mathbf{0} = 3{,}\mathbf{000}$

$5\mathbf{0} \times 6\mathbf{00} = 30{,}\mathbf{000}$

$50 \times 6{,}\mathbf{000} = 30\mathbf{0},\mathbf{000}$

When the product of a basic fact includes a zero, such as $5 \times 6 = 30$, that zero is not part of the pattern.

Multiply. Use mental math.

1. $20 \times 20 =$ _____

2. $50 \times 10 =$ _____

3. $40 \times 40 =$ _____

4. $30 \times 80 =$ _____

5. $60 \times 600 =$ _____

6. $50 \times 900 =$ _____

7. $70 \times 3{,}000 =$ _____

8. $70 \times 6{,}000 =$ _____

9. $40 \times 5{,}000 =$ _____

10. Number Sense Tell what numbers go in the blanks.

To find 90×300, multiply _____ and _____.

Then write _____ zeros at the end.

Name _____

Estimating Products

R 6-2

Estimate 11×94.

Using rounding

Round 11 to 10.

Round 94 to 90.

$10 \times 90 = 900$

11×94 is about 900 days.

Using compatible numbers

Replace 11 with 10.

Replace 94 with 100.

$10 \times 100 = 1{,}000$

11×94 is about 1,000.

To find the **range**, underestimate by replacing with lesser numbers or overestimate by replacing with greater numbers. In the above examples, $10 \times 90 = 900$ is an underestimate and $15 \times 100 = 1{,}500$ is an overestimate. So the range for these estimates is between 900 and 1,500.

Estimate each product.

1. 62×82 _____

2. 59×48 _____

3. 74×302 _____

4. 47×790 _____

5. 498×63 _____

6. 687×38 _____

Estimate each product by finding each range.

7. 32×83 _____

8. 37×22 _____

9. 51×296 _____

10. Number Sense To estimate the product of 37×99, Chris multiplied 40×100. Tell how you know if this is an underestimate or an overestimate.

_____

_____

Name _____

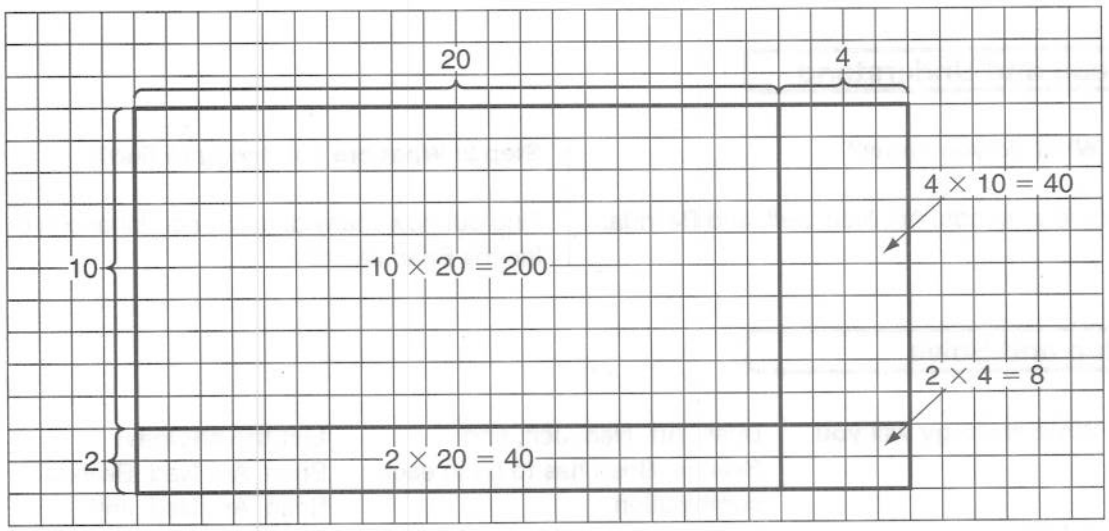
Using Arrays to Multiply

R 6-3

Here is how to find the product of 12 × 24 using an array.

Draw a rectangle 24 units long by 12 units wide.

Divide the rectangle by tens and ones for each factor. Find the number of squares in each smaller square.



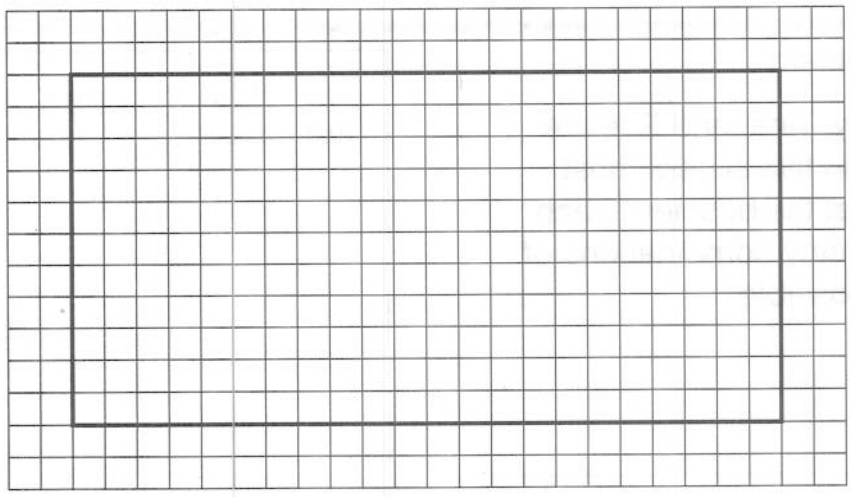
Then add the numbers of the squares in the four rectangles:

200 + 40 + 40 + 8 = 288

So, 12 × 24 = 288.

Divide the rectangle by tens and ones for each factor. Then complete the calculation.

1.



$$\begin{array}{r} 22 \\ \times\ 11 \\ \hline \square\square\square \\ \square\square\square \\ \square\square\square \\ \square\square\square \\ \hline \square\square\square \end{array}$$

Name_____

PROBLEM-SOLVING STRATEGY **R 6-4**

Make an Organized List

Theme Park Brian has four passes to a theme park. He could bring himself and three friends. The group of friends for him to choose from includes Art, Ned, Jeff, and Belinda. How many different combinations are possible?

Read and Understand

Step 1: What do you know?

There are four friends: Art, Ned, Jeff, and Belinda.

Step 2: What are you trying to find?

Find out how many different combinations of friends Brian can take.

Plan and Solve

Step 3: What strategy will you use?

Strategy: Make an Organized List

Brian, Art, Ned, Jeff, and Belinda. Brian has to be in each combination.

List the choices:
Brian, Art, Ned, Belinda
Brian, Art, Ned, Jeff
Brian, Art, Jeff, Belinda
Brian, Ned, Jeff, Belinda

Answer: There are four combinations.

Look Back and Check

Is your work correct?

Yes, because each combination uses Brian. The way the list is organized shows that all ways were found.

Finish solving the problem.

1. Ann, Mara, Jenny, Tina, and Sue are sisters. Two of the five sisters must help their father at his business each Saturday. How many combinations of two sisters are possible?

_____

_____

Ann Mara Jenny Tina
Ann Jenny

Name _____

Multiplying Two-Digit Numbers

R 6-5

There are 24 cars in the race. Each car has a 13-person crew in the pit area. How many pit-area workers are at the race?

Step 1

Multiply the ones.

Regroup if necessary.

$$\begin{array}{r} {\scriptstyle 1} \\ 24 \\ \times 13 \\ \hline 72 \end{array}$$

Step 2

Multiply the tens.

Regroup if necessary.

$$\begin{array}{r} {\scriptstyle 1} \\ 24 \\ \times 13 \\ \hline 72 \\ 240 \end{array}$$

Step 3

Add the partial products.

$$\begin{array}{r} {\scriptstyle 1} \\ 24 \\ \times 13 \\ \hline 72 \\ 240 \\ \hline 312 \end{array}$$

$24 \times 13 = 312$, so there are 312 pit-area workers at the race.

1. $\begin{array}{r} 38 \\ \times\ 26 \\ \hline \end{array}$

2. $\begin{array}{r} 67 \\ \times\ 27 \\ \hline \end{array}$

3. $\begin{array}{r} 44 \\ \times\ 85 \\ \hline \end{array}$

4. $\begin{array}{r} 88 \\ \times\ 32 \\ \hline \end{array}$

5. Number Sense Corina multiplied 62×22 and got a product of 1,042. Explain why Corina's answer is not reasonable.

Name _____

Multiplying Greater Numbers

R 6-6

Multiply 626 × 47.

Step 1

Estimate: 600 × 50 = 30,000

Multiply the ones.

Regroup if necessary.

$$\begin{array}{r} {\scriptstyle 1\,4} \\ 626 \\ \times\ 47 \\ \hline 4{,}382 \end{array}$$

Step 2

Place a zero in the ones place.

Multiply the tens.

Regroup if necessary.

$$\begin{array}{r} {\scriptstyle 1\,2} \\ {\scriptstyle 1\,4} \\ 626 \\ \times\ 47 \\ \hline 4{,}382 \\ 25{,}040 \end{array}$$

Step 3

Add the partial products.

$$\begin{array}{r} {\scriptstyle 1\,2} \\ {\scriptstyle 1\,4} \\ 626 \\ \times\ 47 \\ \hline 4{,}382 \\ 25{,}040 \\ \hline 29{,}422 \end{array}$$

The product 29,422 is reasonable, because it is a little less than the estimate of 30,000.

1. $\begin{array}{r} 113 \\ \times\ 26 \\ \hline \end{array}$

2. $\begin{array}{r} 517 \\ \times\ 44 \\ \hline \end{array}$

3. $\begin{array}{r} 741 \\ \times\ 43 \\ \hline \end{array}$

4. Number Sense Is 11,452 a reasonable answer for 28 × 409? Explain.

_____

_____

_____

_____

Name _____

Choose a Computation Method

R 6-7

When you multiply, first try mental math. Next, think about pencil and paper. For very hard problems, use a calculator.

Find $12 \times \$1{,}000$.

This is easy to do, so you can use mental math.

$12 \times 1{,}000$ is like 12×1 with 3 zeros, or 12,000.

$12 \times \$1{,}000 = \$12{,}000$

Find 810×15.

There are not a lot of regroupings, so you can use pencil and paper.

$$\begin{array}{r} 810 \\ \times\ 15 \\ \hline 4{,}050 \\ 8100 \\ \hline 12{,}150 \end{array}$$

$810 \times 15 = 12{,}150$

Find $56 \times 1{,}287$.

There are a lot of regroupings, so you can use a calculator.

Press: **56** [×] **1287** [ENTER =]

Display: 72072

$56 \times 1{,}287 = 72{,}072$

Multiply. Tell what method you used.

1. $\begin{array}{r} 400 \\ \times\ 40 \\ \hline \end{array}$ _____

2. $\begin{array}{r} 170 \\ \times\ 14 \\ \hline \end{array}$ _____

3. $\begin{array}{r} 784 \\ \times\ 33 \\ \hline \end{array}$ _____

4. Number Sense The heaviest car in the world weighs 7,353 lb. How much would 12 of these cars weigh? What computation method did you use?

_____

Name _____

Multiplying Money

R 6-8

The steps for multiplying money are almost exactly the same as the steps for multiplying whole numbers.

Find $16 \times \$7.89$.

Step 1

Estimate:

$16 \times \$7.89$
$\downarrow \quad \downarrow$
$20 \times \$8 = \$160$

The product should be less than $160.

Step 2

Multiply the ones and then multiply the tens.

$$\begin{array}{r} 5\ 5 \\ \$7.89 \\ \times\ \ 16 \\ \hline 47\ 34 \\ 78\ 90 \end{array}$$

Step 3

Add the partial products. Place the dollar sign and decimal point in the answer.

$$\begin{array}{r} 5\ 5 \\ \$7.89 \\ \times\ \ 16 \\ \hline 47\ 34 \\ 78\ 90 \\ \hline \$126.24 \end{array}$$

The product $126.24 is reasonable, because it is less than the estimate of $160.00.

1. $\begin{array}{r} \$4.68 \\ \times\ \ 14 \\ \hline \end{array}$

2. $\begin{array}{r} \$5.17 \\ \times\ \ 33 \\ \hline \end{array}$

3. $\begin{array}{r} \$9.14 \\ \times\ \ 23 \\ \hline \end{array}$

4. $\begin{array}{r} \$8.57 \\ \times\ \ 19 \\ \hline \end{array}$

5. Number Sense Romario multiplies $18 \times \$5.35$. Which of the following is most likely the product: $96.30, $9.60, or $960.30? Explain.

_____

_____

_____

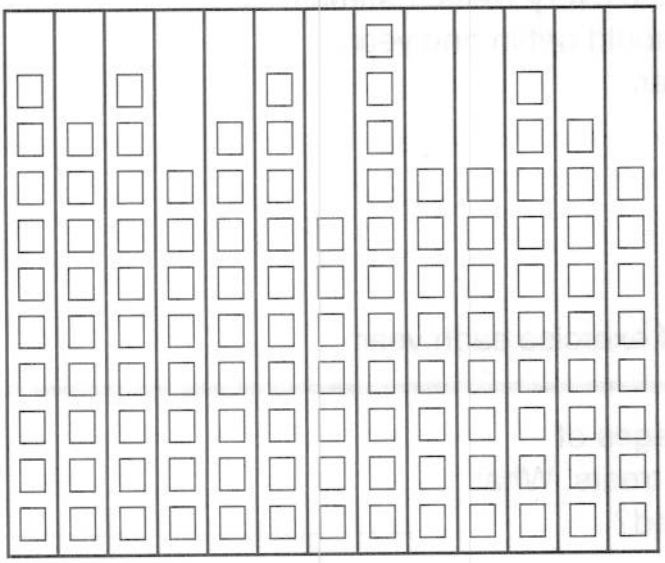
Name _____

PROBLEM-SOLVING SKILL **R 6-9**

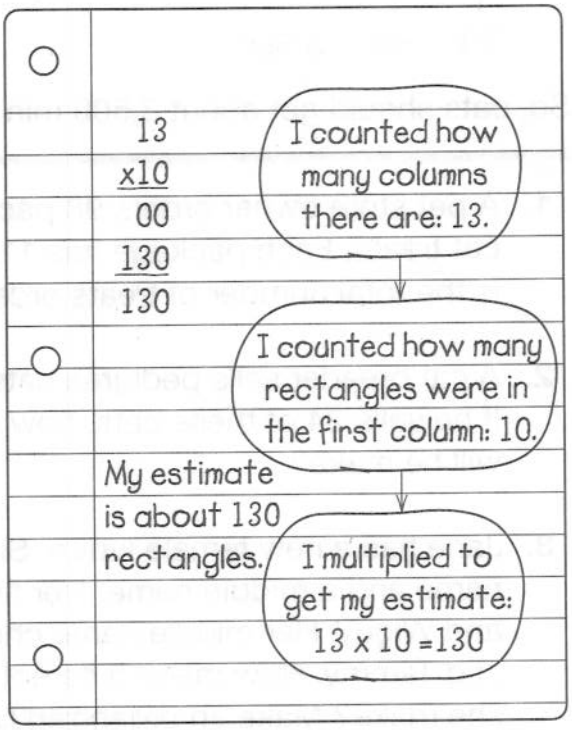
Writing to Explain

Here are some things you can do to write a good explanation in math.

Estimate the number of rectangles in all of the columns.



Show your computation clearly. Think about how you got your estimate. A flowchart can organize your thoughts. Write your steps in order.



1. Use the pictograph to find out how many toy cars Andy has. Show your computation. You may use a flowchart to help show your thinking.

Toy Car Collection

Matthew	
Andy	
Ronald	

Each = 25 cars.

Name _____

PROBLEM-SOLVING APPLICATIONS **R 6-10**

Cats

Cats are popular pets. Scientists estimate that there are over 100 million cats in the United States.

Cats should get about 70 min of exercise every week. Estimate how many minutes of exercise a cat should get in one year. Remember, there are 52 weeks in a year.

Use rounding:

$$\begin{array}{c} 70 \times 52 \\ \downarrow \quad \downarrow \\ 70 \times 50 = 3{,}500 \end{array}$$

So, cats should get about 3,500 min of exercise each year.

1. A pet store owner orders 98 packages of cat treats. Each package has 115 treats. What is the total number of treats ordered? _____

2. A cat breeder sells pedigree cats for $297. If he sells 24 of these cats, how much money will he make? _____

3. Jane has a new female kitten. She wants to give it a first name and a middle name. Her first name choices are Fluffy and Wiggy. Her middle name choices are Margie, Carla, and Tammy. How many different name combinations can she make? Make an organized list to solve this problem.

_____

_____

_____

_____

_____

_____