

Multiplication

Unit 2

Name _____

Unit 2 Notes

Numbers called factors are multiplied or added repeatedly to get an answer called a product.

Factors- numbers multiplied together to find a product

Product- the answer to a multiplication problem

$$5 \times 8 = 40$$

factor \times factor = product

Array- an arrangement of items in columns and rows

X X X X X X

X X X X X X

X X X X X X

3 \times 6 or

3 groups of 6

O O O O

2 \times 4 or

O O O O

2 groups of 4

Area- the amount of surface covered by a figure measured in square units (sq. units)

Properties of Multiplication

Commutative Property -Changing the order of the factors does not change the product.

$$6 \times 4 = 24 \quad 4 \times 6 = 24$$

Associative Property- grouping the factors in different ways does not change the product.

$$(3 \times 5) \times 2 = 30 \quad 3 \times (5 \times 2) = 30$$

Distributive Property- you can multiply each addend by the same number, then add.

$$3 \times 18 = (3 \times 10) \text{ and } (3 \times 8) \quad \textit{remember 18 is 10 + 8}$$

$$4 \times 15 \quad \textit{15 can be expanded to 10 + 5}$$

$$(4 \times 10) + (4 \times 5)$$

partial product + partial product

*****Parentheses** - () mean "solve me first".

Partial product- a number that is one part of the final product (answer).

Rounding

Sometimes we round numbers to make them easier to work with if we do not need our answer to be an exact amount.

Rounding is one way to estimate, but not the only way.

If the digit before the place value being rounded to is the digit 0-4 we leave the rounded place value the same. All place values to the right become zeros. All place values to the left stay the same.

If the digit before the place value being rounded to is the digit 5-9 we increase the rounded place value by one. All place values to the right become zeros. All place values to the left stay the same.

*****If you are asked to estimate a product (multiplication answer), round to the largest place value.**

Underline,

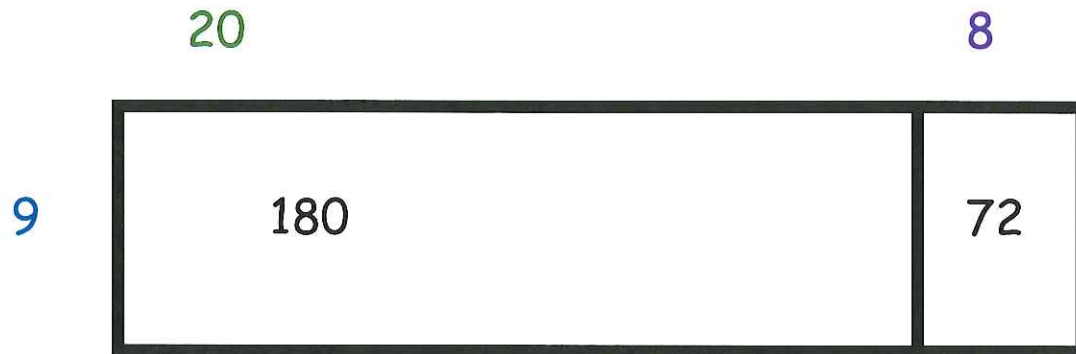
look behind,

4 or less let it rest,

5 or more up the score.

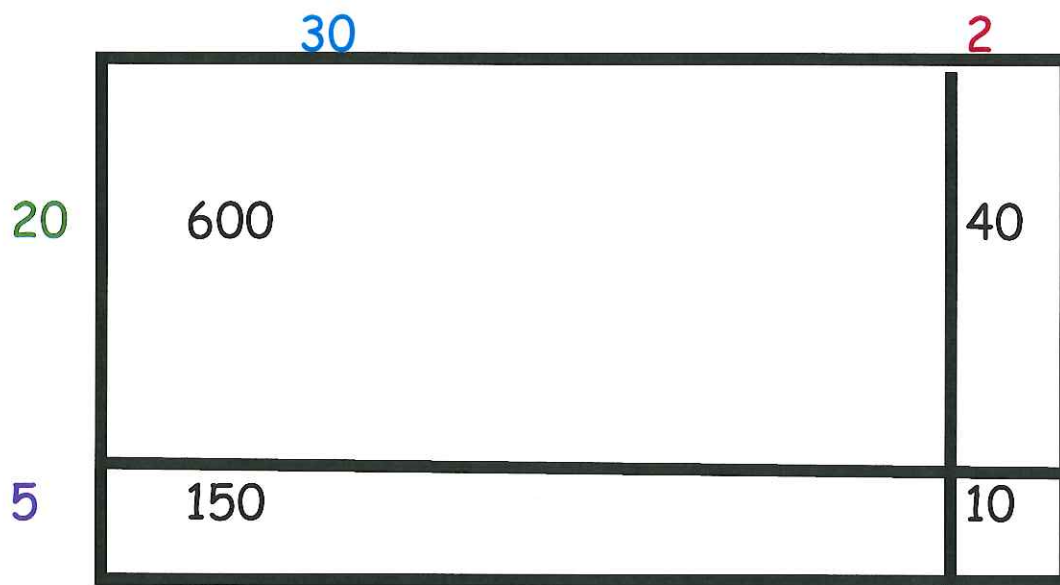
Area model for multiplication- a multiplication model that shows each place-value product within a rectangle drawing

$$9 \times 28 = 252$$



$$180 + 72 = 252$$

$$25 \times 32 = 800$$



$$600 + 150 + 40 + 10 = 800$$

Skip counting tunes:

3- Mary Had A Little Lamb

4- Row, Row, Row Your Boat

6- Old Mc Donald

7- Happy Birthday

8- Frosty the Snowman

9- You Are My Sunshine



LESSON
23

Multiply Tens, Hundreds, and Thousands

OBJECTIVE Multiply tens, hundreds, and thousands by whole numbers through 10.

You can use a pattern to multiply with tens, hundreds, and thousands.

Count the number of zeros in the factors.

$4 \times 6 = 24$ ← basic fact

$4 \times 60 = 240$ ← When you multiply by tens, the last digit in the product is 0.

$4 \times 600 = 2,400$ ← When you multiply by hundreds, the last two digits in the product are 0.

$4 \times 6,000 = 24,000$ ← When you multiply by thousands, the last three digits in the product are 0.

When the basic fact has a zero in the product, there will be an extra zero in the final product:

$5 \times 4 = 20$, so $5 \times 4,000 = 20,000$

Complete the pattern.

1. $9 \times 2 = 18$

$9 \times 20 = \underline{\hspace{2cm}}$

$9 \times 200 = \underline{\hspace{2cm}}$

$9 \times 2,000 = \underline{\hspace{2cm}}$

2. $8 \times 4 = 32$

$8 \times 40 = \underline{\hspace{2cm}}$

$8 \times 400 = \underline{\hspace{2cm}}$

$8 \times 4,000 = \underline{\hspace{2cm}}$

3. $6 \times 6 = 36$

$6 \times 60 = \underline{\hspace{2cm}}$

$6 \times 600 = \underline{\hspace{2cm}}$

$6 \times 6,000 = \underline{\hspace{2cm}}$

4. $4 \times 7 = 28$

$4 \times 70 = \underline{\hspace{2cm}}$

$4 \times 700 = \underline{\hspace{2cm}}$

$4 \times 7,000 = \underline{\hspace{2cm}}$

Find the product.

5. $7 \times 300 = 7 \times \underline{\hspace{1cm}}$ hundreds

$= \underline{\hspace{1cm}}$ hundreds

$= \underline{\hspace{1cm}}$

6. $5 \times 8,000 = 5 \times \underline{\hspace{1cm}}$ thousands

$= \underline{\hspace{1cm}}$ thousands

$= \underline{\hspace{1cm}}$

LESSON
24
Estimate Products

OBJECTIVE Estimate products by rounding and determine if exact answers to multiplication problems are reasonable.

You can use rounding to estimate products.

Round the greater factor. Then use mental math to estimate the product.

6×95

Step 1 Round 95 to the nearest hundred.

95 rounds to 100.

$6 \times 1 = 6$

Step 2 Use patterns and mental math.

$6 \times 10 = 60$

$6 \times 100 = 600$

Find two numbers the exact answer is between.

7×759

Step 1 Estimate by rounding to the lesser hundred.

7×759

Think: $7 \times 7 = 49$
 $7 \times 70 = 490$
 $7 \times 700 = 4,900$

$7 \times 700 = 4,900$

Step 2 Estimate by rounding to the greater hundred.

7×759

Think: $7 \times 8 = 56$
 $7 \times 80 = 560$
 $7 \times 800 = 5,600$

$7 \times 800 = 5,600$

So, the product is between 4,900 and 5,600.

Estimate the product by rounding.

1. 6×316

2. 5×29

3. 4×703

Estimate the product by finding two numbers the exact answer is between.

4. 3×558

5. 7×252

6. 8×361

LESSON
25

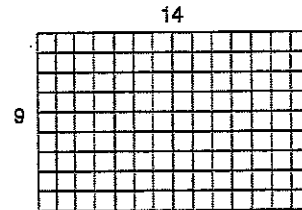
Multiply Using the Distributive Property

OBJECTIVE Use the Distributive Property to multiply a 2-digit number by a 1-digit number.

You can use rectangular models to multiply 2-digit numbers by 1-digit numbers.

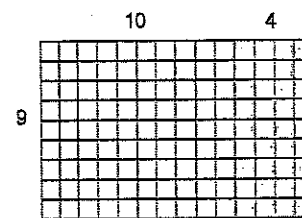
Find 9×14 .

Step 1 Draw a 9 by 14 rectangle on grid paper.



Step 2 Use the Distributive Property and products you know to break apart the model into two smaller rectangles.

Think: $14 = 10 + 4$.



Step 3 Find the product each smaller rectangle represents.

$9 \times 10 = 90$

$9 \times 4 = 36$

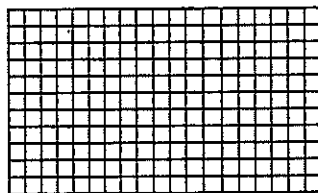
Step 4 Find the sum of the products.

$90 + 36 = 126$

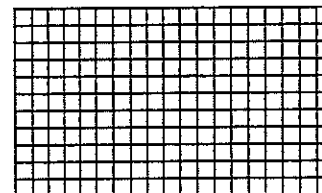
So, $9 \times 14 = 126$.

Model the product on the grid. Record the product.

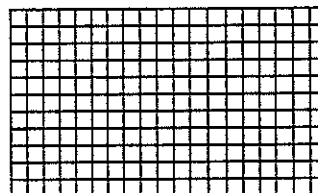
1. 3×13



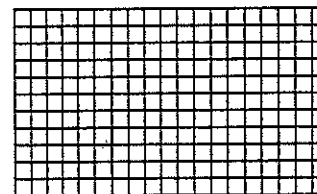
2. 6×16



3. 5×17



4. 4×14



LESSON
26

Multiply Using Expanded Form

OBJECTIVE Use expanded form to multiply a multidigit number by a 1-digit number.

You can use expanded form or a model to find products.

Multiply. 3×26

Think and Write

Step 1 Write 26 in expanded form.

$$26 = 20 + 6$$

$$3 \times 26 = 3 \times (20 + 6)$$

Step 2 Use the Distributive Property.

$$3 \times 26 = (3 \times 20) + (\underline{3} \times \underline{6})$$

Step 3 Multiply the tens.
Multiply the ones.

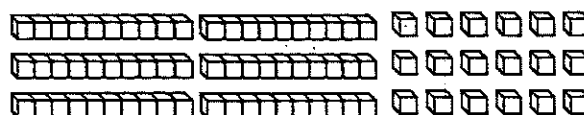
$$\begin{array}{r} 3 \times 26 = (3 \times 20) + (3 \times 6) \\ = \underline{60} + \underline{18} \end{array} \quad \begin{array}{r} 60 \\ + 18 \\ \hline 78 \end{array}$$

Step 4 Add the partial products.

So, $3 \times 26 = \underline{78}$

Use a Model

Step 1 Show 3 groups of 26.



Step 2 Break the model into tens and ones.



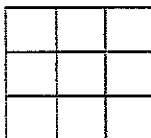
$$\begin{array}{r} (3 \times 2 \text{ tens}) \quad (3 \times 6 \text{ ones}) \\ (3 \times 20) \quad (3 \times 6) \\ \underline{60} \quad \quad \underline{18} \end{array}$$

Step 3 Add to find the total product.

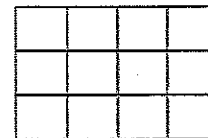
$$\underline{60} + \underline{18} = \underline{78}$$

Record the product. Use expanded form to help.

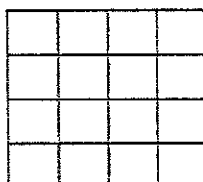
1. $6 \times 14 =$ _____



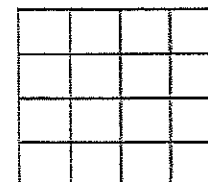
2. $4 \times 52 =$ _____



3. $5 \times 162 =$ _____



4. $3 \times 279 =$ _____





LESSON
29

Multiply 2-Digit Numbers with Regrouping

OBJECTIVE Use regrouping to multiply a 2-digit number by a 1-digit number.

Use place value to multiply with regrouping.

Multiply. 7×63

Step 1 Estimate the product.

$$7 \times 60 = 420$$

Step 2 Multiply the ones. Regroup 21 ones as 2 tens 1 one. Record the 1 one below the ones column and the 2 tens above the tens column.

$$\begin{array}{r} 2 \\ 63 \\ \times 7 \\ \hline 1 \end{array}$$

$$7 \times 3 \text{ ones} = 21 \text{ ones}$$

Step 3 Multiply the tens. Then, add the regrouped tens. Record the tens.

$$\begin{array}{r} 2 \\ 63 \\ \times 7 \\ \hline 441 \end{array}$$

44 tens = 4 hundreds
4 tens

$$7 \times 6 \text{ tens} = 42 \text{ tens}$$

Add the 2 regrouped tens.

$$42 \text{ tens} + 2 \text{ tens} = 44 \text{ tens}$$

So, $7 \times 63 = 441$. Since 441 is close to the estimate of 420, it is reasonable.

Estimate. Then record the product.

1. Estimate: _____

$$\begin{array}{r} 42 \\ \times 6 \\ \hline \end{array}$$

2. Estimate: _____

$$\begin{array}{r} \$98 \\ \times 6 \\ \hline \end{array}$$

3. Estimate: _____

$$\begin{array}{r} 37 \\ \times 8 \\ \hline \end{array}$$

4. Estimate: _____

$$\begin{array}{r} \$54 \\ \times 9 \\ \hline \end{array}$$

5. Estimate: _____

$$\begin{array}{r} 37 \\ \times 5 \\ \hline \end{array}$$

6. Estimate: _____

$$\begin{array}{r} 93 \\ \times 4 \\ \hline \end{array}$$

7. Estimate: _____

$$\begin{array}{r} 86 \\ \times 9 \\ \hline \end{array}$$

8. Estimate: _____

$$\begin{array}{r} 59 \\ \times 7 \\ \hline \end{array}$$



LESSON
32

Estimate Products

OBJECTIVE Estimate products by rounding or by using compatible numbers.

You can use rounding and compatible numbers to estimate products.

Use mental math and rounding to estimate the product.

Estimate. $62 \times \$23$

Step 1 Round each factor to the nearest ten.

62 rounds to 60.
\$23 rounds to \$20.

Step 2 Rewrite the problem using the rounded numbers.

$60 \times \$20$

Step 3 Use mental math.

$6 \times \$2 = \12
 $6 \times \$20 = \120
 $60 \times \$20 = \$1,200$

So, $62 \times \$23$ is about \$1,200.

Use mental math and compatible numbers to estimate the product.

Estimate. 24×78

Step 1 Use compatible numbers. 25×80

Step 2 Use $25 \times 4 = 100$ to help find 25×8 .
 $25 \times 8 = 200$

Step 3 Since 80 has 1 zero, write 1 zero to the right of the product.

24×78
↓ ↓
 $25 \times 80 = 2,000$

So, 24×78 is about 2,000.

Estimate the product. Choose a method.

1. 78×21

2. $59 \times \$46$

3. 81×33

4. 67×21

5. $88 \times \$42$

6. 51×36

7. 73×73

8. $99 \times \$44$

9. 92×19

10. 26×37

11. 89×18

12. 58×59

LESSON
33

Area Models and Partial Products

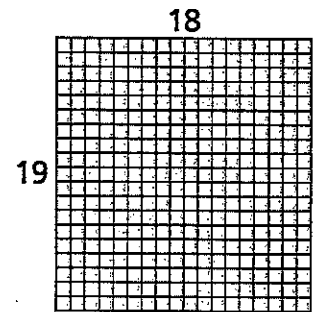
OBJECTIVE Use area models and partial products to multiply 2-digit numbers.

You can use area models to multiply 2-digit numbers by 2-digit numbers.

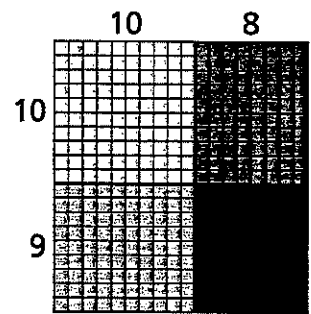
Use the model and partial products to solve.

Draw a rectangle to find 19×18 .

The rectangle is 19 units long and 18 units wide.



Step 1 Break apart the factors into tens and ones.
Divide the area model into four smaller rectangles to show the factors.



Step 2 Find the products for each of the smaller rectangles.

$$10 \times 10 = 100 \quad 10 \times 8 = 80 \quad 9 \times 10 = 90 \quad 9 \times 8 = 72$$

Step 3 Find the sum of the products. $100 + 80 + 90 + 72 = 342$

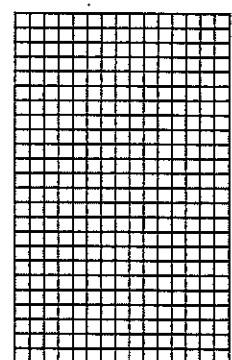
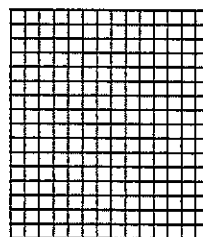
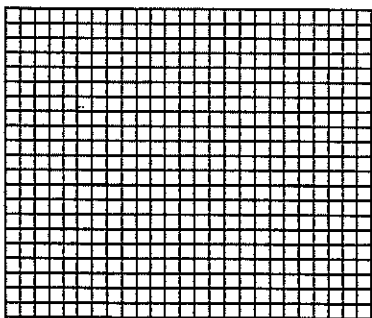
So, $19 \times 18 = 342$.

Draw a model to represent the product. Then record the product.

1. 21×25

2. 16×14

3. 24×15





LESSON
35

Multiply with Regrouping

OBJECTIVE Use regrouping to multiply 2-digit numbers.

Estimate. Then use regrouping to find 28×43 .

Step 1 Round to estimate the product. $30 \times 40 = 1,200$

Step 2 Think: $28 = 2$ tens 8 ones.
 Multiply 43 by 8 ones.
 $8 \times 3 = 24$. Record the 4.
 Write the regrouped 2 above the tens place. $8 \times 40 = 320$.
 Add the regrouped tens:
 $320 + 20 = 340$.

$$\begin{array}{r} 2 \\ 43 \\ \times 28 \\ \hline 344 \end{array} \leftarrow 8 \times 43$$

Step 3 Multiply 43 by 2 tens.
 $20 \times 3 = 60$ and $20 \times 40 = 800$.
 Record 860 below 344.

$$\begin{array}{r} 2 \\ 43 \\ \times 28 \\ \hline 344 \\ + 860 \\ \hline 1,204 \end{array} \leftarrow 20 \times 43$$

Step 4 Add the partial products. $1,204 \leftarrow 344 + 860$

So, $28 \times 43 = 1,204$. 1,204 is close to 1,200. The answer is reasonable.

Estimate. Then find the product.

1. Estimate: _____ 2. Estimate: _____ 3. Estimate: _____

$$\begin{array}{r} 36 \\ \times 12 \\ \hline \end{array}$$

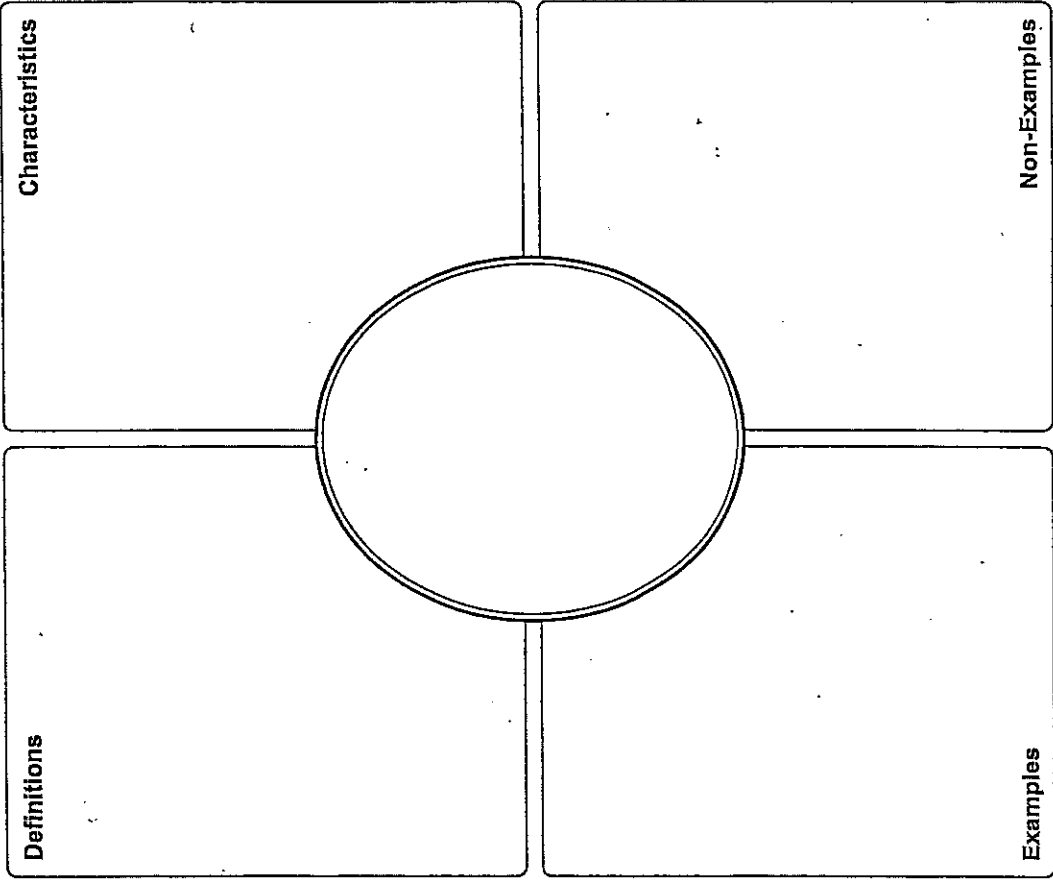
$$\begin{array}{r} 43 \\ \times 29 \\ \hline \end{array}$$

$$\begin{array}{r} 51 \\ \times 47 \\ \hline \end{array}$$

Frayer Model Diagram

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Date: _____

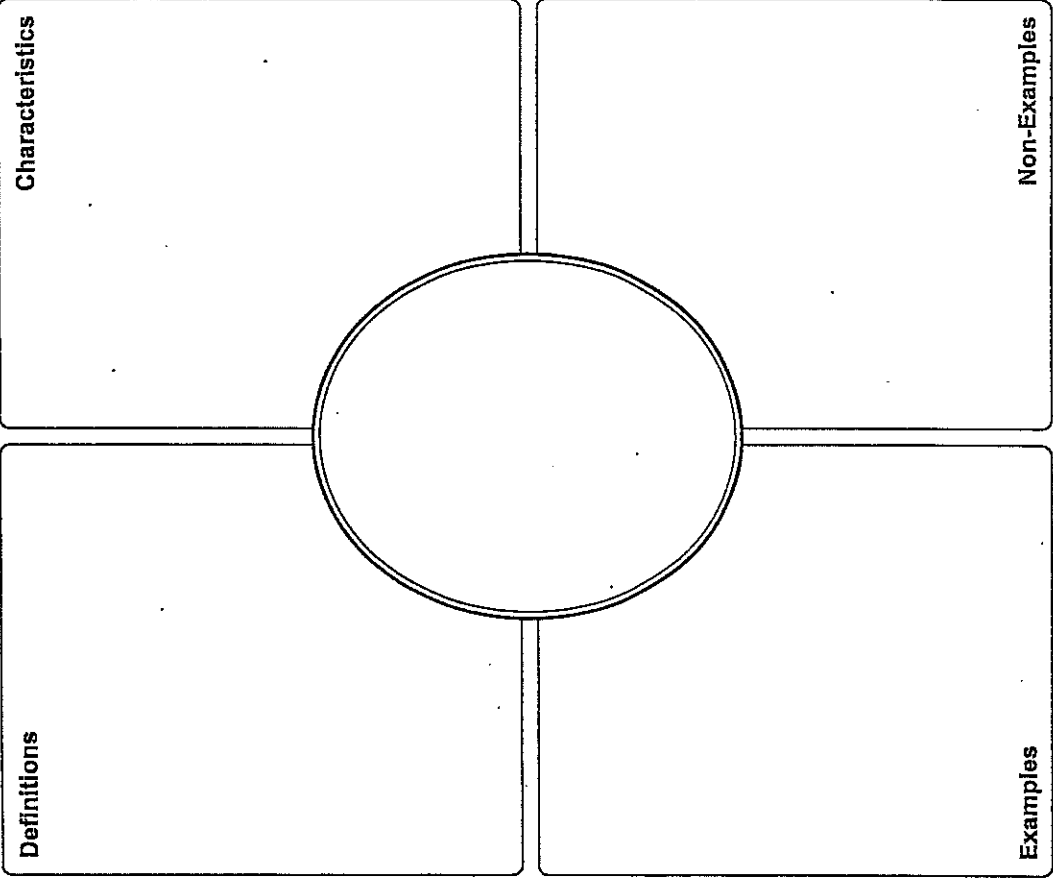


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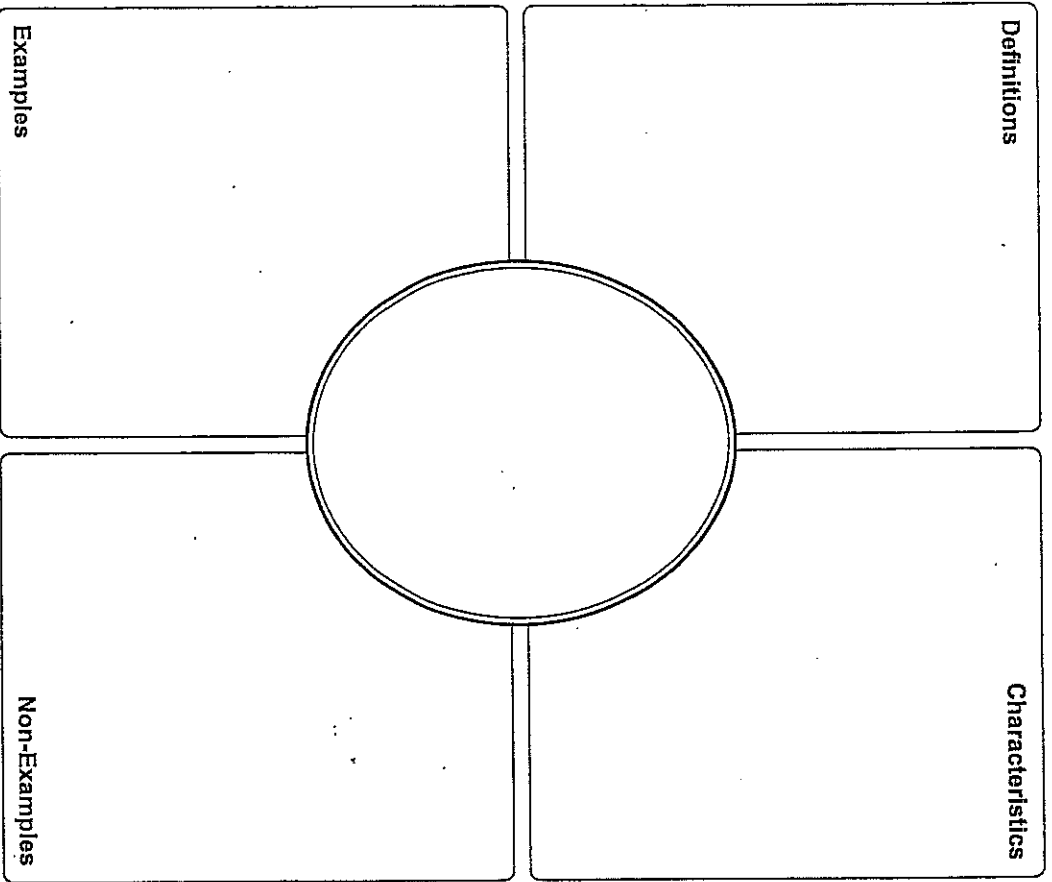


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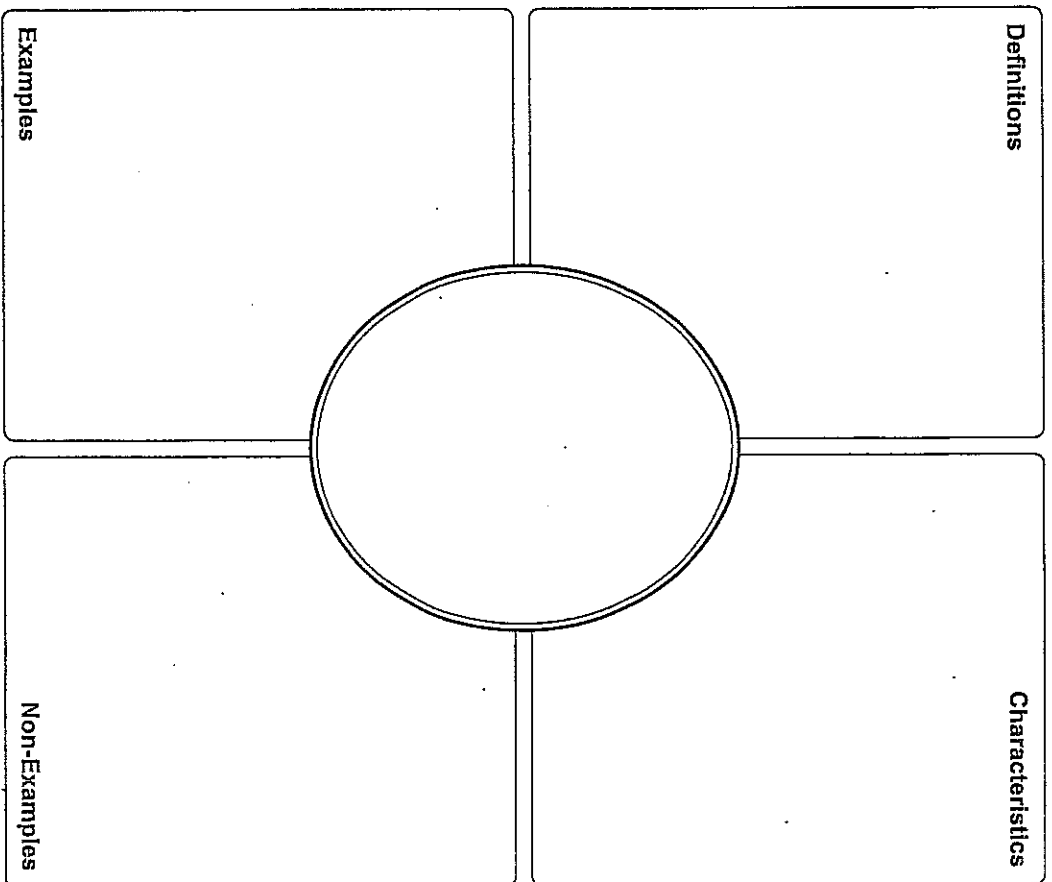


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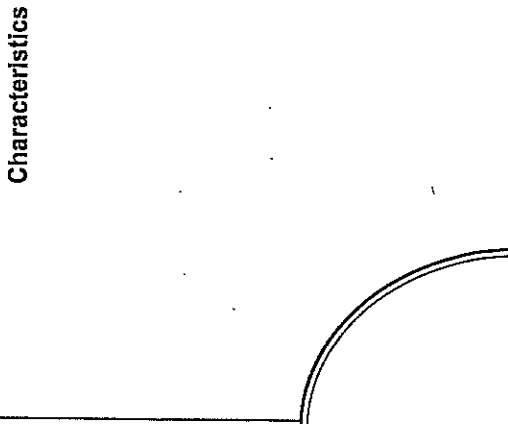
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Frayer Model Diagram

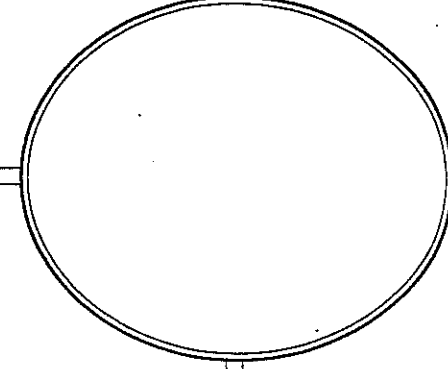
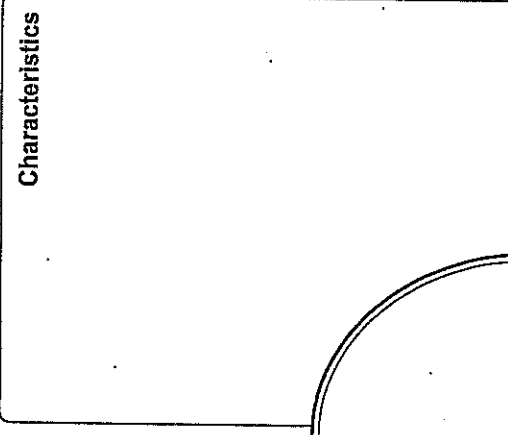
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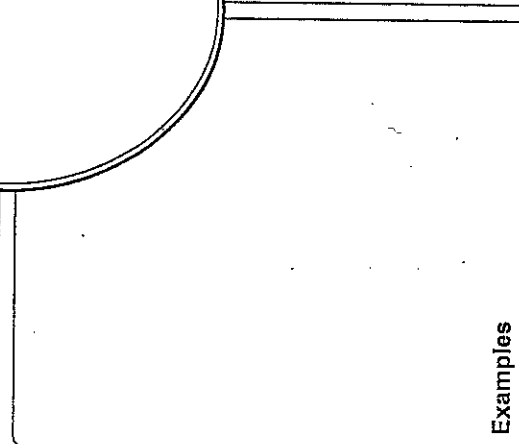
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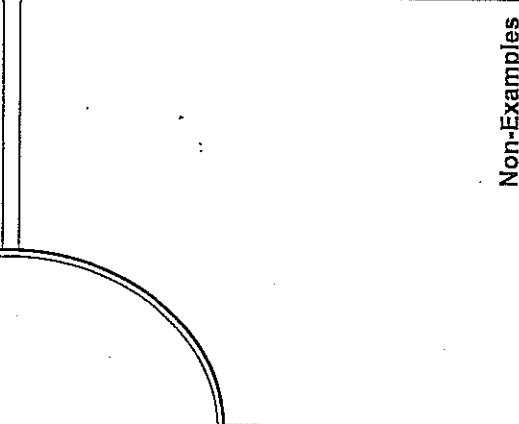
Characteristics



Examples



Non-Examples

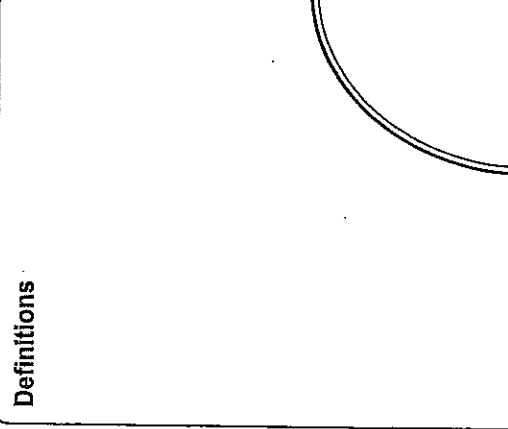


Frayer Model Diagram

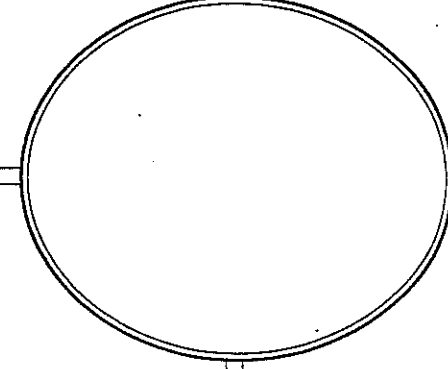
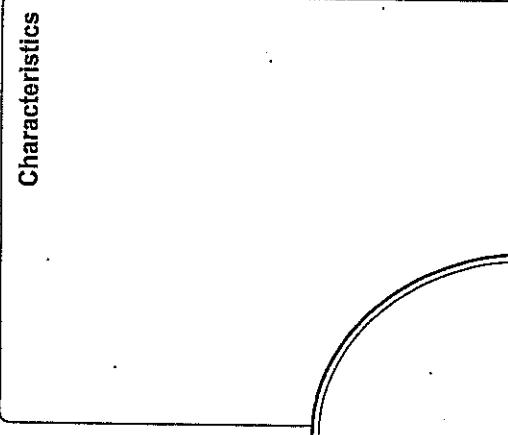
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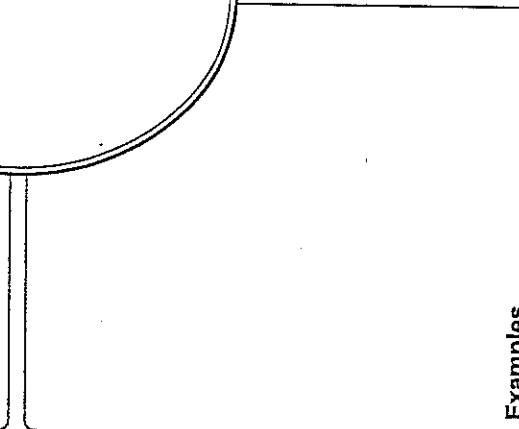
Definitions



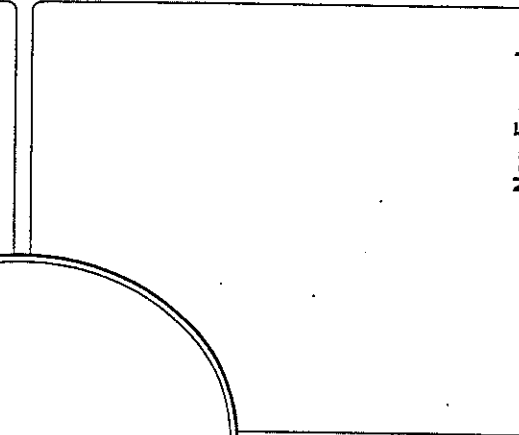
Characteristics



Examples



Non-Examples



Name _____



Multiply Tens, Hundreds, and Thousands

Find the product.

1. $4 \times 7,000 = \underline{28,000}$

Think: $4 \times 7 = 28$

So, $4 \times 7,000 = 28,000$.

2. $9 \times 60 = \underline{\hspace{2cm}}$

3. $8 \times 200 = \underline{\hspace{2cm}}$

4. $5 \times 6,000 = \underline{\hspace{2cm}}$

5. $7 \times 800 = \underline{\hspace{2cm}}$

6. $8 \times 90 = \underline{\hspace{2cm}}$

7. $6 \times 3,000 = \underline{\hspace{2cm}}$

8. $3 \times 8,000 = \underline{\hspace{2cm}}$

9. $5 \times 500 = \underline{\hspace{2cm}}$

10. $9 \times 4,000 = \underline{\hspace{2cm}}$

11. $7 \times 7,000 = \underline{\hspace{2cm}}$

12. $3 \times 40 = \underline{\hspace{2cm}}$

13. $4 \times 5,000 = \underline{\hspace{2cm}}$

14. $2 \times 9,000 = \underline{\hspace{2cm}}$

Problem Solving

15. A bank teller has 7 rolls of coins. Each roll has 40 coins. How many coins does the bank teller have?

16. Theo buys 5 packages of paper. There are 500 sheets of paper in each package. How many sheets of paper does Theo buy?

Remembering

Read and write each number in expanded form.

1. 71 _____

2. 298 _____

3. 5,627 _____

4. 3,054 _____

Read and write each number in standard form.

5. $500 + 80 + 3$

6. $9,000 + 200 + 40 + 1$

7. eight hundred seventeen
_____8. one thousand, six hundred forty-six

Read and write each number in word form.

9. $90 + 7$ _____

10. $300 + 10 + 2$ _____

11. $4,000 + 100 + 80 + 5$ _____

12. $8,000 + 700 + 6$ _____

13. **Stretch Your Thinking** Emmy planted onion bulbs in her backyard garden, giving each bulb one square foot of space. She arranged the onion bulbs in a rectangular array of 4 rows with 5 in each row. Make a sketch of Emmy's onion patch. How many onion bulbs did she plant? What is the area of the onion patch? Identify three other rectangular arrangements Emmy could have used to plant these onion bulbs.

Name _____



Estimate Products

Estimate the product by rounding.

1. 4×472

4×472



4×500

2,000

2. $2 \times 6,254$

3. 9×54

4. $5 \times 5,503$

5. 3×832

6. 6×98

7. $8 \times 3,250$

8. 7×777

Find two numbers the exact answer is between.

9. 3×567

10. $6 \times 7,381$

11. 4×94

12. 8×684

Problem Solving

13. Isaac drinks 8 glasses of water each day. He says he will drink 2,920 glasses of water in a year that has 365 days. Is the exact answer reasonable? **Explain.**

14. Most Americans throw away about 1,365 pounds of trash each year. Is it reasonable to estimate that Americans throw away over 10,000 pounds of trash in 5 years? **Explain.**

Remembering

Write the number of thousands and the number of hundreds in each number.

1. 4,672

_____ thousands

_____ hundreds

2. 1,023

_____ thousands

_____ hundreds

3. 610

_____ thousands

_____ hundreds

Read and write each number in expanded form.

4. twenty-five thousand, three hundred fifty-one

5. five hundred six thousand, five hundred ninety-eight

6. nine hundred thirteen thousand, eight hundred twenty-seven

Find the area (in square units) of a rectangle with the given dimensions.

7. 4×6 _____

8. 4×60 _____

9. 9×2 _____

10. 90×2 _____

11. 3×7 _____

12. 70×3 _____

13. **Stretch Your Thinking** Li is using place value to multiply 90×30 .

$$\begin{aligned} 90 \times 30 &= (9 \times 10) \times (3 \times 10) \\ &= (9 \times 3) \times (10 \times 10) \\ &= 27 \times 10 \\ &= 270 \end{aligned}$$

Is Li's answer correct? Explain.

Name _____

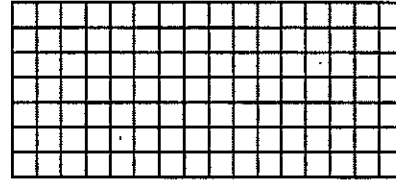
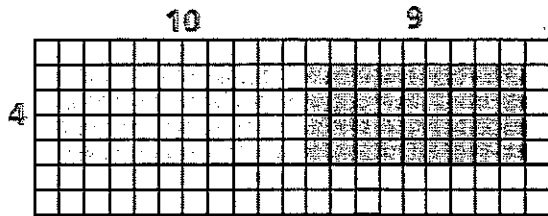


Multiply Using the Distributive Property

Model the product on the grid. Record the product.

1. $4 \times 19 = \underline{\quad 76 \quad}$

2. $5 \times 13 = \underline{\hspace{2cm}}$



$4 \times 10 = 40$ and $4 \times 9 = 36$

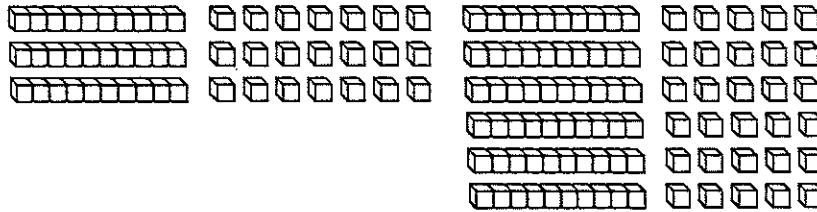
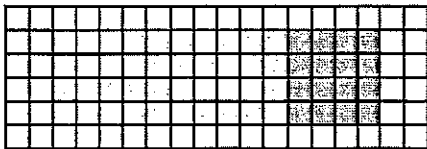
$40 + 36 = 76$

Find the product.

3. $4 \times 14 = \underline{\hspace{2cm}}$

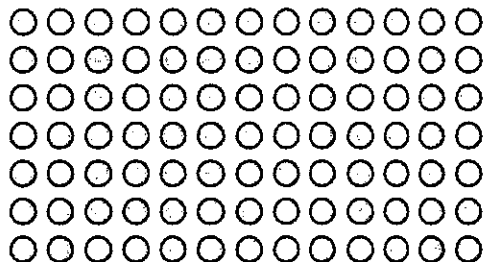
4. $3 \times 17 = \underline{\hspace{2cm}}$

5. $6 \times 15 = \underline{\hspace{2cm}}$



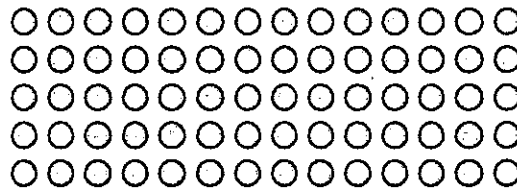
Problem Solving

6. Michael arranged his pennies in the following display.



How many pennies does Michael have in all?

7. A farmer has an apple orchard with the trees arranged as shown below.



If the farmer wants to pick one apple from each tree, how many apples will he pick?

Remembering

Add or subtract.

$$\begin{array}{r} 1. \quad 2,728 \\ + 7,245 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 83,054 \\ + 1,496 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 27,300 \\ - 9,638 \\ \hline \end{array}$$

Use any method to add.

$$\begin{array}{r} 4. \quad 4,335 \\ + 2,694 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 3,806 \\ + 8,129 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 6,401 \\ + 7,763 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 9,826 \\ + 8,531 \\ \hline \end{array}$$

Solve each problem.

$$8. \quad 10 \times \underline{\hspace{2cm}} = 6 \text{ tens}$$

$$9. \quad 10 \times 9 = \underline{\hspace{2cm}}$$

$$10. \quad \underline{\hspace{2cm}} \times 10 = 2 \text{ tens}$$

$$11. \quad \underline{\hspace{2cm}} \times 10 = 5 \text{ tens}$$

$$12. \quad 10 \times 4 \text{ tens} = \underline{\hspace{2cm}}$$

$$13. \quad 10 \times \underline{\hspace{2cm}} = 7 \text{ hundreds}$$

$$14. \quad 10 \times \underline{\hspace{2cm}} = 8 \text{ tens}$$

$$15. \quad \underline{\hspace{2cm}} \times 10 = 3 \text{ tens}$$

16. **Stretch Your Thinking** Lucas says that since 40×70 and 60×50 both have factors with a total of two zeros, they will both have products with a total of two zeros. Is he correct? Explain.

Name _____



Multiply Using Expanded Form

Record the product. Use expanded form to help.

1. $7 \times 14 = \underline{\hspace{2cm} 98 \hspace{2cm}}$

2. $8 \times 43 = \underline{\hspace{2cm}}$

$$\begin{aligned} 7 \times 14 &= 7 \times (10 + 4) \\ &= (7 \times 10) + (7 \times 4) \\ &= 70 + 28 \\ &= 98 \end{aligned}$$

3. $6 \times 532 = \underline{\hspace{2cm}}$

4. $5 \times 923 = \underline{\hspace{2cm}}$

5. $4 \times 2,371 = \underline{\hspace{2cm}}$

6. $7 \times 1,829 = \underline{\hspace{2cm}}$

Problem Solving

7. The fourth-grade students at Riverside School are going on a field trip. There are 68 students on each of the 4 buses. How many students are going on the field trip?

8. There are 5,280 feet in one mile. Hannah likes to walk 5 miles each week for exercise. How many feet does Hannah walk each week?

Remembering

Round each number to the nearest hundred.

1. 283 _____

2. 729 _____

3. 954 _____

Round each number to the nearest thousand.

4. 4,092 _____

5. 6,550 _____

6. 5,381 _____

Compare using $>$, $<$, or $=$.

7. 92,800 _____ 92,830

8. 165,000 _____ 156,000

9. 478,390 _____ 478,390

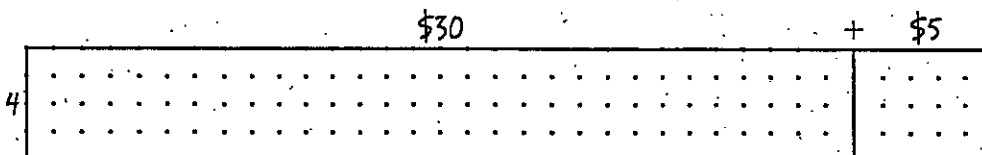
10. 736,218 _____ 89,479

Find each product by factoring the tens. Draw rectangles if you need to.

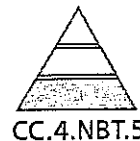
11. 3×2 , 3×20 , and 3×200

12. 7×3 , 7×30 , and 7×300

13. **Stretch Your Thinking** Write a word problem that could be solved using the rectangle model shown. Then solve the problem by finding the tens product, the ones product, and the total product.



Name _____



Multiply 2-Digit Numbers with Regrouping

Estimate. Then record the product.

1. Estimate: 150 2. Estimate: _____ 3. Estimate: _____ 4. Estimate: _____

$$\begin{array}{r} 1 \\ 46 \\ \times 3 \\ \hline 138 \end{array}$$

$$\begin{array}{r} 32 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} \$55 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 61 \\ \times 8 \\ \hline \end{array}$$

5. Estimate: _____ 6. Estimate: _____ 7. Estimate: _____ 8. Estimate: _____

$$\begin{array}{r} 37 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} \$18 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 83 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 95 \\ \times 8 \\ \hline \end{array}$$

9. Estimate: _____ 10. Estimate: _____ 11. Estimate: _____ 12. Estimate: _____

$$\begin{array}{r} 94 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 57 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 72 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} \$79 \\ \times 8 \\ \hline \end{array}$$

Problem Solving

13. Sharon is 54 inches tall. A tree in her backyard is 5 times as tall as she is. The floor of her treehouse is at a height that is twice as tall as she is. What is the difference, in inches, between the top of the tree and the floor of the treehouse?

14. Mr. Diaz's class is taking a field trip to the science museum. There are 23 students in the class, and a student admission ticket is \$8. How much will the student tickets cost?

Remembering

Estimate each sum. Then solve to check your estimate.

1. $288 + 609$ _____

Solve.

Show your work.

2. During one weekend, a museum had 7,850 visitors on Saturday and 5,759 visitors on Sunday.

About how many visitors were there that weekend?

Exactly how many visitors were there that weekend?

Draw a rectangle model. Find the tens product, the ones product, and the total product.

3. 7×42

4. 5×67

5. **Stretch Your Thinking** Marcia says she can use *rounding* to find the *exact* product of 6×75 . She says that since 75 is halfway between 7 tens and 8 tens, the exact product of 6×75 must be halfway between 6×70 and 6×80 . Is she correct? Explain.

#

Name: _____

Multiplication: 2-Digits by 1-Digit

Date: _____

a.	$\begin{array}{r} 62 \\ \times 3 \\ \hline \end{array}$	b.	$\begin{array}{r} 38 \\ \times 5 \\ \hline \end{array}$	c.	$\begin{array}{r} 9 \\ \times 6 \\ \hline \end{array}$
d.	$\begin{array}{r} 75 \\ \times 7 \\ \hline \end{array}$	e.	$\begin{array}{r} 19 \\ \times 8 \\ \hline \end{array}$	f.	$\begin{array}{r} 50 \\ \times 4 \\ \hline \end{array}$
g.	$\begin{array}{r} 96 \\ \times 2 \\ \hline \end{array}$	h.	$\begin{array}{r} 77 \\ \times 8 \\ \hline \end{array}$	i.	$\begin{array}{r} 37 \\ \times 3 \\ \hline \end{array}$
j.	$\begin{array}{r} 86 \\ \times 1 \\ \hline \end{array}$	k.	$\begin{array}{r} 32 \\ \times 7 \\ \hline \end{array}$	l.	$\begin{array}{r} 48 \\ \times 2 \\ \hline \end{array}$
m.	$\begin{array}{r} 60 \\ \times 7 \\ \hline \end{array}$	n.	$\begin{array}{r} 45 \\ \times 6 \\ \hline \end{array}$	o.	$\begin{array}{r} 73 \\ \times 9 \\ \hline \end{array}$

Remembering

The table shows the approximate height of the world's five tallest mountain peaks. Use the data in the table to help answer the following questions.

1. How tall are the two tallest mountain peaks combined?

2. Which two mountain peaks combined are 56,190 feet tall?

Mountain	Height (in feet)
Everest	29,035
K2	28,250
Kangchenjunga	28,169
Lhotse	27,940
Makalu	27,766

Subtract.

3. $586,720 - 293,415 =$ _____

4. $917,336 - 904,582 =$ _____

Estimate each product. Solve to check your estimate.

5. 5×39

6. 6×64

7. 9×23

8. 7×48

9. **Stretch Your Thinking** Explain how the Expanded Notation Method is used to multiply 82×3 .

Name: _____

Multiplying 2-Digit by 1-Digit Numbers

a.
$$\begin{array}{r} 43 \\ \times 2 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 37 \\ \times 9 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 20 \\ \times 8 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 58 \\ \times 7 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 65 \\ \times 8 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 32 \\ \times 5 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 99 \\ \times 4 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 87 \\ \times 3 \\ \hline \end{array}$$

i.
$$\begin{array}{r} 42 \\ \times 7 \\ \hline \end{array}$$

j.
$$\begin{array}{r} 38 \\ \times 4 \\ \hline \end{array}$$

k.
$$\begin{array}{r} 13 \\ \times 5 \\ \hline \end{array}$$

l.
$$\begin{array}{r} 39 \\ \times 6 \\ \hline \end{array}$$

m.
$$\begin{array}{r} 89 \\ \times 7 \\ \hline \end{array}$$

n.
$$\begin{array}{r} 74 \\ \times 3 \\ \hline \end{array}$$

o.
$$\begin{array}{r} 62 \\ \times 7 \\ \hline \end{array}$$

Remembering

Subtract. Show your new groups.

$$\begin{array}{r} 1. \quad 4,000 \\ - 1,946 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 8,441 \\ - 7,395 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 9,340 \\ - 8,614 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 1,587 \\ - 1,200 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 6,193 \\ - 3,295 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 4,006 \\ - 2,631 \\ \hline \end{array}$$

Use the Expanded Notation Method to solve the problem.

Complete the steps.

7. 5×68 _____

8. **Stretch Your Thinking** Jenna made 6 bracelets using 32 beads each. Kayla made 7 bracelets using 29 beads each. Who used more beads? Use the Distributive Property to solve the problem.

Name _____



Multiply 3-Digit and 4-Digit Numbers with Regrouping

Estimate. Then find the product.

1. Estimate: 4,000 2. Estimate: _____ 3. Estimate: _____ 4. Estimate: _____

$$\begin{array}{r} \\ 1,467 \\ \times \\ \hline 5,868 \end{array}$$

$$\begin{array}{r} 5,339 \\ \times \\ \hline \end{array}$$

$$\begin{array}{r} \$879 \\ \times \\ \hline \end{array}$$

$$\begin{array}{r} 3,182 \\ \times \\ \hline \end{array}$$

5. Estimate: _____ 6. Estimate: _____ 7. Estimate: _____ 8. Estimate: _____

$$\begin{array}{r} 4,616 \\ \times \\ \hline \end{array}$$

$$\begin{array}{r} \$2,854 \\ \times \\ \hline \end{array}$$

$$\begin{array}{r} 7,500 \\ \times \\ \hline \end{array}$$

$$\begin{array}{r} 948 \\ \times \\ \hline \end{array}$$

9. Estimate: _____ 10. Estimate: _____ 11. Estimate: _____ 12. Estimate: _____

$$\begin{array}{r} 1,752 \\ \times \\ \hline \end{array}$$

$$\begin{array}{r} 550 \\ \times \\ \hline \end{array}$$

$$\begin{array}{r} 6,839 \\ \times \\ \hline \end{array}$$

$$\begin{array}{r} \$9,614 \\ \times \\ \hline \end{array}$$

Problem Solving

- 13.** Lafayette County has a population of 7,022 people. Columbia County's population is 8 times as great as Lafayette County's population. What is the population of Columbia County?
- _____
- 14.** A seafood company sold 9,125 pounds of fish last month. If 6 seafood companies sold the same amount of fish, how much fish did the 6 companies sell last month in all?
- _____

Remembering

Subtract. Then use addition to check the subtraction.

Show your work.

1. $6,459 - 921 =$ _____

2. $5,603 - 3,284 =$ _____

Check: _____

Check: _____

3. $7,863 - 2,734 =$ _____

4. $9,582 - 1,447 =$ _____

Check: _____

Check: _____

Use the Algebraic Notation Method to solve each problem.

Complete the steps.

5. $4 \cdot 93$ _____

6. $3 \cdot 78$ _____

7. **Stretch Your Thinking** Xander says that the Place Value Sections Method, the Expanded Notation Method, and the Algebraic Notation Method of multiplying a one-digit number by a two-digit number are pretty much the same. Do you agree or disagree? Explain.

Name: _____

Multiplication: 3-Digits by 1-Digit

a.	7	6	2	b.	4	3	8	c.	2	0	9
x			3	x			5	x			6
<hr/>				<hr/>				<hr/>			
d.	5	7	5	e.	1	1	9	f.	2	5	0
x			7	x			8	x			4
<hr/>				<hr/>				<hr/>			
g.	3	9	6	h.	8	7	7	i.	7	3	7
x			2	x			8	x			3
<hr/>				<hr/>				<hr/>			
j.	4	8	6	k.	7	3	2	l.	9	4	8
x			1	x			7	x			2
<hr/>				<hr/>				<hr/>			
m.	7	6	0	n.	1	4	5	o.	3	7	3
x			7	x			6	x			9
<hr/>				<hr/>				<hr/>			

Remembering

Add or subtract.

$$\begin{array}{r} 1. \quad 6,095 \\ + 2,382 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 53,894 \\ - 12,914 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 629,137 \\ - 508,978 \\ \hline \end{array}$$

Solve each problem.

Show your work.

4. During the first half of a college basketball game, 24,196 people entered the athletic center. During the second half, 2,914 people left and 4,819 people entered. How many people were in the athletic center at the end of the game?
-

5. Miles had three sets of building blocks. His first set had 491 pieces. His second set had 624 pieces. Miles combined his three sets for a total of 1,374 pieces. How many pieces had been in his third set?
-

Use any method to solve. Sketch a rectangle model if you need to.

6. 6×23 _____

7. 8×44 _____

8. 3×95 _____

9. **Stretch Your Thinking** A bookcase has 3 shelves with 38 books each and 4 shelves with 29 books each. How many books are in the bookcase? Use any method to solve. Show your work.
-

Name _____



Estimate Products

Estimate the product. Choose a method.

1. 38×21

$$\begin{array}{r} 38 \times 21 \\ \downarrow \quad \downarrow \\ 40 \times 20 \end{array}$$

800

2. 63×19

3. $27 \times \$42$

4. 73×67

5. $37 \times \$44$

6. 85×71

7. 88×56

8. 97×13

9. 92×64

Problem Solving

10. A dime has a diameter of about 18 millimeters. About how many millimeters long would a row of 34 dimes be?

11. A half-dollar has a diameter of about 31 millimeters. About how many millimeters long would a row of 56 half-dollars be?

Remembering

Answer each question about the information in the table.

1. What is the combined population of Midborough and Bigville?
- _____

2. How many more people live in Superburg than in Smalltown?
- _____

Population of Five Cities	
Smalltown	38,346
Midborough	49,725
Centervale	79,086
Bigville	123,267
Superburg	184,903

Use any method to solve. Sketch a rectangle model, if you need to.

3. $3 \times 91 =$ _____ 4. $7 \times 65 =$ _____ 5. $6 \times 84 =$ _____

Solve using any numerical method. Use rounding and estimating to see if your answer makes sense.

6.
$$\begin{array}{r} 45 \\ \times 7 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 28 \\ \times 9 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 81 \\ \times 7 \\ \hline \end{array}$$

9.
$$\begin{array}{r} 56 \\ \times 3 \\ \hline \end{array}$$

10. **Stretch Your Thinking** Whether using the Place Value Sections Method, the Expanded Notation Method, or the Algebraic Notation Method, the same basic steps can be used to multiply a one-digit number by a three-digit number. Put these steps in order by numbering 1 through 3.

_____ Add the partial products.

_____ Write the three-digit number in expanded form.

_____ Multiply the one-digit number by each of the values in expanded form.

Name _____



Area Models and Partial Products

Draw a model to represent the product.
Then record the product.

1. 13×42

2. 18×34

3. 22×26

	40	2
10	400	20
3	120	6

$400 + 20 + 120 + 6 = \underline{546}$ _____

4. 15×33

5. 23×29

6. 19×36

Problem Solving

7. Sebastian made the following model to find the product 17×24 .

	20	4
10	200	40
7	14	28

$200 + 40 + 14 + 28 = 282$

8. Each student in Ms. Sike's kindergarten class has a box of crayons. Each box has 36 crayons. If there are 18 students in Ms. Sike's class, how many crayons are there in all?

Is his model correct? Explain.

Remembering

Add or subtract.

$$\begin{array}{r} 1. \quad 5,900 \\ - 1,386 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 54,371 \\ + 12,703 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 800,000 \\ - 753,192 \\ \hline \end{array}$$

Solve using any numerical method. Use rounding and estimating to check your work.

$$\begin{array}{r} 4. \quad 83 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 36 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 94 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 44 \\ \times 8 \\ \hline \end{array}$$

Draw a rectangle model. Solve using any method that relates to the model.

8. $6 \times 358 =$ _____

9. $4 \times 692 =$ _____

10. **Stretch Your Thinking** Write a word problem that involves multiplication and addition. Include extra numerical information. Solve the problem, showing your work.

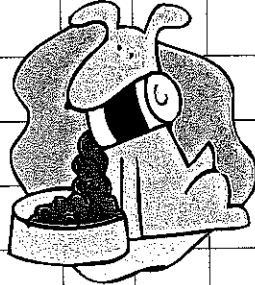
Name: _____

Multiplication: 2-digit by 2-digit

Doggie Multiplication

a.

$$\begin{array}{r} 68 \\ \times 92 \\ \hline \end{array}$$



b.

$$\begin{array}{r} 71 \\ \times 33 \\ \hline \end{array}$$

c.

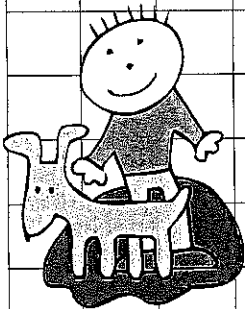
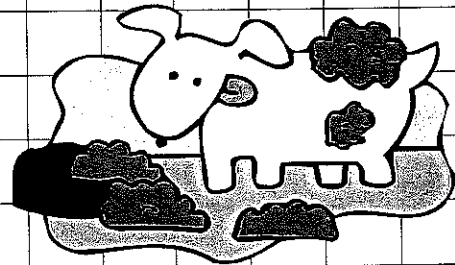
$$\begin{array}{r} 98 \\ \times 93 \\ \hline \end{array}$$

d.

$$\begin{array}{r} 50 \\ \times 12 \\ \hline \end{array}$$

e.

$$\begin{array}{r} 64 \\ \times 47 \\ \hline \end{array}$$



f.

$$\begin{array}{r} 45 \\ \times 38 \\ \hline \end{array}$$

g.

$$\begin{array}{r} 80 \\ \times 80 \\ \hline \end{array}$$

h.

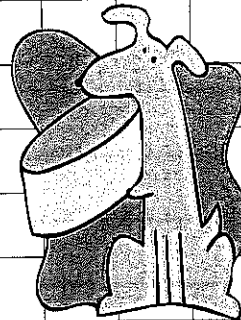
$$\begin{array}{r} 79 \\ \times 23 \\ \hline \end{array}$$

i.

$$\begin{array}{r} 87 \\ \times 76 \\ \hline \end{array}$$

j.

$$\begin{array}{r} 30 \\ \times 18 \\ \hline \end{array}$$



k.

$$\begin{array}{r} 51 \\ \times 49 \\ \hline \end{array}$$

Remembering

What is 851,632 rounded to the nearest:

1. hundred? _____

2. thousand? _____

3. ten thousand? _____

4. hundred thousand? _____

Compare using $>$, $<$, or $=$.

5. 58,320 ○ 58,320

6. 642,810 ○ 64,281

7. 427,900 ○ 428,000

8. 71,253 ○ 409,135

Draw a rectangle model. Solve using any method that relates to the model.

9. $6 \times 358 =$ _____

10. $4 \times 692 =$ _____

Tell what additional information is needed to solve the problem.

11. Rosalina knitted 8 scarves for gifts. She used 38 feet of yarn for each scarf. How much did Rosalina spend on the yarn?

12. **Stretch Your Thinking** How many smaller rectangles are there in an area model that represents 27×83 ? Why? What are their dimensions?

Remembering

Estimate each sum. Then solve to check your estimate.

1. $289 + 503$ _____

2. $4,199 + 684$ _____

3. $8,128 + 895$ _____

Cross out the extra numerical information and solve.

Show your work.

4. Marlene is making 4 batches of muffins for her drama party. Each batch requires 2 cups of flour and makes 24 muffins. How many muffins will Marlene have for the party?
- _____

5. One pack of batteries costs \$6 and contains 9 batteries. Trevor bought 3 packs of batteries. How much did Trevor spend on batteries?
- _____

Sketch an area model for each exercise. Then find the product.

6. 54×38 _____

7. 49×75 _____

8. **Stretch Your Thinking** Jackson used the Shortcut Method to multiply 84×37 . Did he do it correctly? Explain.

$$\begin{array}{r} 1 \\ 2 \\ 84 \\ \times 37 \\ \hline 588 \\ + 252 \\ \hline 840 \end{array}$$

Name: _____ Multiplication: 3-Digits by 2-Digits

a.	5	2	3	b.	1	3	0	c.	4	7	2
x		1	2	x		4	3	x		4	9
<hr/>			<hr/>			<hr/>			<hr/>		
d.	6	9	3	e.	5	0	3	f.	4	9	9
x		2	5	x		3	0	x		8	1
<hr/>			<hr/>			<hr/>			<hr/>		
g.	2	5	6	h.	5	0	0	i.	9	7	8
x		4	1	x		3	0	x		1	6
<hr/>			<hr/>			<hr/>			<hr/>		
j.	2	0	4	k.	6	7	9	l.	6	0	8
x		8	9	x		7	3	x		3	6
<hr/>			<hr/>			<hr/>			<hr/>		

Name: _____

Multiplication Word Problems

Directions: Solve the word problems below. Show your work.

1. Mrs. Moore took her 4th grade class of 25 students to the aquarium. Admission for each student was \$12. What was the total amount of money needed for the field trip?
2. Eighty-seven students were passing around a petition to stop the historical building from being demolished. Each student collected 92 signatures. What was the total number of signatures the students collected?
3. Sandy walks 26 miles in a month. If she were consistent in her walking for 2 years, how many miles will she have walked?
4. If there are 60 minutes in one hour, how many minutes are in a 24 hour day?
5. John sold 36 cookbooks at \$27 each. How much did he make?
6. An adult human has 32 teeth. If there are 83 adults in a room how many teeth is that in all?

Name: _____

Multiplication Word Problems

Use multiplication to solve each problem. Use the empty space to the right of each problem to show your work. Write your answer on the blank line by each question.



1. Justin, Carl, Ryan, and Will each have seventy-two alien trading cards. How many cards do they have in all?

Answer: _____

2. Jason has 9 quarters. How much money does he have?

Answer: _____

3. Carla earns \$13 an hour cleaning houses. How much will she earn if she works from 8:00am to 2:00pm?

Answer: _____

4. Harry buys 9 dozen eggs. How many eggs does he have in all?

Answer: _____

5. There are 93 calories in a small candy bar. How many calories are there in a half dozen small candy bars?

Answer: _____

6. Kyle's phone bill is \$45 per month. How much does he have to pay for half a year of phone service?

Answer: _____

Work Space

Study Guide

Fill in the circle for the correct answer.

Multiply.

1. $80 \times 60 =$

(A) 48

(B) 480

(C) 4,800

(D) 48,000

2. $13 \times 67 =$

(F) 761

(G) 771

(H) 851

(K) 871

Solve.

3. Each student in Mr. Evans's class has 35 sheets of construction paper. If there are 30 students, how many sheets of construction paper are there in all?

(A) 950

(B) 1,050

(C) 1,150

(D) 1,250

4. At the local theater, 76 matinee tickets sold for \$12 each and 94 evening tickets sold for \$20 each. What is the difference in sales between matinee and evening tickets?

(F) \$8

(G) \$724

(H) \$968

(K) \$978

Choose the number sentence that can be used to find the product shown by the area model.

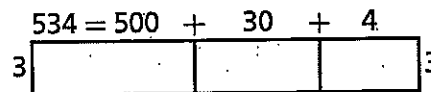
5. $3 \times 534 =$

(A) $(3 \times 500) + (3 \times 30) + (3 \times 3) = 1,599$

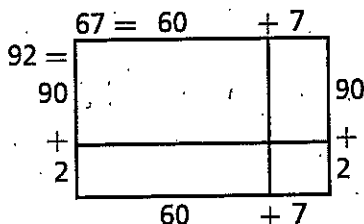
(B) $(3 \times 500) + (3 \times 30) + (3 \times 4) = 1,602$

(C) $(3 \times 500) + (4 \times 30) + (3 \times 3) = 1,629$

(D) $(3 \times 500) + (4 \times 30) + (4 \times 3) = 1,632$



6. $92 \times 67 =$



(F) $(90 + 2) \times (60 + 7) = 5,400 + 630 + 120 + 14 = 6,164$

(G) $(90 + 2) \times (60 + 7) = 5,400 + 630 + 120 + 9 = 6,159$

(H) $(90 + 7) \times (60 + 2) = 5,400 + 180 + 420 + 14 = 6,014$

(K) $(90 + 7) \times (60 + 2) = 5,400 + 180 + 420 + 9 = 6,009$

Choose the products that complete the pattern.

7. $6 \times 9 = 54$

$6 \times 90 = 540$

$60 \times 90 = 5,400$

$6 \times 900 = \square$

$6 \times 9,000 = \square$

(A) 5,400 and 5,400

(B) 5,400 and 54,000

(C) 54,000 and 54,000

(D) 54,000 and 5,400,000

Multiply.

8. $7 \times 83 = \square$

(F) 561

(G) 571

(H) 581

(K) 591

9. $38 \times 4 = \square$

(A) 122

(B) 132

(C) 142

(D) 152

10. $5 \times 703 = \square$

(F) 3,505

(G) 3,515

(H) 3,605

(K) 3,615

11. $347 \times 3 = \square$

(A) 1,041

(B) 1,021

(C) 941

(D) 921

12. $18 \times 70 = \square$

(F) 1,060

(G) 1,160

(H) 1,260

(K) 1,360

13. $14 \times 56 = \square$

(A) 784

(B) 764

(C) 684

(D) 664

14. $9 \times 4,698 = \square$

(F) 41,182

(G) 41,282

(H) 42,182

(K) 42,282

15. $3,608 \times 6 = \square$

(A) 11,648

(B) 11,848

(C) 21,648

(D) 22,848

Choose the best estimate of the product.

16. $4 \times 64 =$

Ⓕ $4 \times 60 = 240$

Ⓖ $10 \times 60 = 600$

Ⓗ $4 \times 70 = 280$

Ⓚ $10 \times 70 = 700$

17. $43 \times 89 =$

Ⓐ $40 \times 80 = 3,200$

Ⓑ $40 \times 90 = 3,600$

Ⓒ $50 \times 90 = 4,500$

Ⓓ $50 \times 100 = 5,000$

18. $38 \times 30 =$

Ⓕ $30 \times 30 = 900$

Ⓖ $40 \times 30 = 1,200$

Ⓗ $50 \times 20 = 1,000$

Ⓚ $50 \times 30 = 1,500$

19. $7 \times 2,943 =$

Ⓐ $(7 \times 3,000) + (7 \times 1,000) = 28,000$

Ⓑ $(7 \times 3,000) + (7 \times 900) = 27,300$

Ⓒ $(7 \times 2,000) + (7 \times 900) = 20,300$

Ⓓ $(7 \times 2,000) + (7 \times 500) = 17,500$

Find the exact cost.

Show your work.

20. Season tickets at an amusement park costs \$57 per ticket. If someone buys 5 tickets, what will be the total cost?

Ⓕ \$255

Ⓖ \$265

Ⓗ \$275

Ⓚ \$285

21. A manager at the sports store buys team caps for \$6 per cap. If the manager buys 143 caps, how much will she pay for the caps?

Ⓐ \$858

Ⓑ \$848

Ⓒ \$758

Ⓓ \$748

22. A farmer buys 4 cows. If each cow costs \$543, how much will the cows cost altogether?

Ⓕ \$2,062

Ⓖ \$2,072

Ⓗ \$2,162

Ⓚ \$2,172

Solve.

Show your work.

23. A toy company employee ships 168 jigsaw puzzles on Monday. He ships 175 jigsaw puzzles on Tuesday. Each puzzle weighs 4 pounds. How many pounds do the jigsaw puzzles weigh in all?

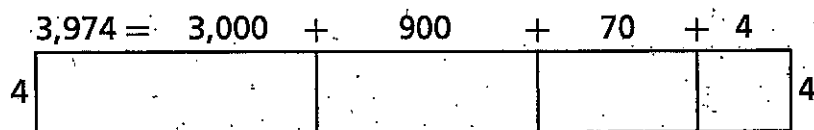
(A) 1,372 pounds (C) 1,232 pounds
(B) 1,362 pounds (D) 1,222 pounds

24. Jillian took her dogs to the pet store. She bought 5 toys. She paid \$25 each to have her 2 big dogs groomed and \$12 each to have her 2 small dogs groomed. She bought dog treats for \$24. How much did it cost to have her dogs groomed?

(F) \$66 (G) \$74 (H) \$90 (K) \$98

25. Which number sentence can be used to find the product shown by the area model?

$$4 \times 3,974 = \square$$



- (A) $(4 \times 3,000) + (4 \times 900) + (4 \times 7) + 4 = 15,632$
(B) $(4 \times 3,000) + (4 \times 900) + (4 \times 7) + (4 \times 4) = 15,644$
(C) $(4 \times 3,000) + (4 \times 900) + (4 \times 70) + 4 = 15,884$
(D) $(4 \times 3,000) + (4 \times 900) + (4 \times 70) + (4 \times 4) = 15,896$