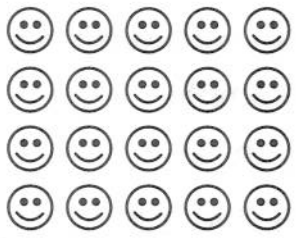
Name _____

Meanings for Multiplication

R 3-1



There are 4 rows of 5.

Addition sentence:

$5 + 5 + 5 + 5 = 20$

Multiplication sentence:

$4 \times 5 = 20$

There are 3 boxes. There are 7 books in each box.

There are 3 groups of 7.

Addition sentence:

$7 + 7 + 7 = 21$

Multiplication sentence:

$3 \times 7 = 21$

Write an addition sentence and a multiplication sentence for each picture.

1. 

_____

2. 

_____

Write a multiplication sentence for each addition sentence.

3. $10 + 10 + 10 + 10 = 40$ _____

4. $3 + 3 + 3 + 3 + 3 + 3 = 18$ _____

5. Number Sense Explain how multiplication can help you find $7 + 7 + 7$.

_____

Name _____

Patterns in Multiplying by 0, 1, 2, 5, and 9

R 3-2

Pattern	Example
All multiples of two are even numbers.	2, 18, 44
All multiples of 5 end in 0 or 5.	25, 100, 220
For all multiples of nine, the sum of the digits is always a multiple of 9.	27 $2 + 7 = 9$ 63 $6 + 3 = 9$
The product of any number and zero is zero.	$17 \times 0 = 0$
The product of any number and one is that number.	$32 \times 1 = 32$
Two numbers can be multiplied in any order and the product will be the same.	$4 \times 5 = 20$ $5 \times 4 = 20$

1. 9×5

2. 2×8

3. 8×5

4. 9×0

5. 9×3

6. 7×2

7. 0×3

8. 1×56

9. How many baseball cards are in 4 packages?

_____

Item	Number in Package
Baseball cards	5
Stickers	2
Coupon	1

10. How many stickers do you get if you buy 9 packages?

_____

11. How many coupons do you get if you buy 7 packages?

_____

Name _____

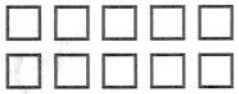
Using Known Facts to Find Unknown Facts

R 3-3

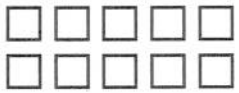
You can use breaking apart to find a product.

Find 4×5.

4 groups of 5 are the same as 2 groups of 5 and 2 groups of 5.



$2 \times 5 = 10$



$2 \times 5 = 10$

$4 \times 5 = 2 \times 5 + 2 \times 5$

$= 10 + 10$

$= 20$

Use breaking apart to find each product.

1. 3×5

2. 8×3

3. 4×9

4. 7×7

5. 8×4

6. 8×8

7. 6×3

8. 4×4

Compare. Use <, >, or = to fill in each ◯.

9. 7×6 ◯ 5×7

10. 9×4 ◯ 4×9

11. 4×4 ◯ 2×8

12. 7×8 ◯ 9×5

Name _____

Multiplying by 10, 11, and 12

R 3-4

Here are some easy ways to multiply numbers by 10, 11, and 12.

Multiples of 10

Any whole number multiplied by 10 will always equal that number with an additional zero in the ones place.

For example, $2 \times 10 = 20$, $22 \times 10 = 220$, and $220 \times 10 = 2{,}200$.

You can also break apart equations to help find products.

Multiples of 11

To find 12×11, think of 11 as $10 + 1$.

$12 \times 10 = 120$, $12 \times 1 = 12$, $120 + 12 = 132$, so $12 \times 11 = 132$.

Multiples of 12

To find 6×12, think of 12 as $10 + 2$.

$6 \times 10 = 60$, $6 \times 2 = 12$, $60 + 12 = 72$, so $6 \times 12 = 72$.

1. $5 \times 11 =$ _____ **2.** $12 \times 4 =$ _____ **3.** $10 \times 9 =$ _____

4. $7 \times 12 =$ _____ **5.** $12 \times 11 =$ _____ **6.** $8 \times 10 =$ _____

7. Number Sense Explain how 9×10 can help you find 9×11.

_____

There are 11 players on the field for each football team during a game. How many players would there be on

8. 4 teams? _____

9. 8 teams? _____

10. 10 teams? _____

11. 11 teams? _____

Name _____

PROBLEM-SOLVING STRATEGY **P 3-5**

Make a Table

Complete the table to solve the problem. Write the answer in a complete sentence.

1. The grocery store is having a sale on canned vegetables. If you buy 1 can, you get 2 free. How many cans do you need to buy to get 16 cans free?

Cans purchased	1	2	3	4	5	6	7	8	9
Free cans	2	4							

_____

2. Grandma wanted to help Jennifer learn to multiply. On the first day of Jennifer's visit, Grandma gave her 2 charms for her charm bracelet. On the second day, Grandma gave Jennifer 4 charms. On the third day, she gave Jennifer 8 charms. How many charms did Grandma give Jennifer on the sixth day of her visit?

Day	1	2	3	4	5	6	7
Charms	2	4	8				

_____

For Exercise 3, make a table. Use it to find the answer.

3. Juan decided to raise money for his camping trip by selling lemonade. He charged $1.00 for 1 glass, $1.25 for 2 glasses, $1.50 for 3 glasses, and so on. How much money did Juan charge for 5 glasses of lemonade?

_____

Name _____

Meanings for Division

P 3-6

Draw pictures to solve each problem.

1. There are 12 small gift bags. Each bag can hold 1 toy and some stickers. There are 36 stickers. If an equal number of stickers is put in each bag, how many stickers will be in each bag?

   _____

2. One egg carton holds 12 eggs. How many cartons are you able to fill with 60 eggs?

   _____

3. There are 21 students in Mr. Tentler's class. The students divided themselves evenly into 3 groups. How many students are in each group? _____

Test Prep

4. Calvin read an 18-page chapter in his social studies book in 2 hours. If he read the same number of pages each hour, how many pages did he read per hour?

   A. 3 pages **B.** 6 pages **C.** 9 pages **D.** 12 pages

5. **Writing in Math** The class is planning a party. The pizza restaurant cuts each pizza into 8 slices. There are 32 students. How many pizzas does the class need to order for each student to have a slice? Explain.

   _____

   _____

Name _____

Relating Multiplication and Division

R 3-7

Multiplication and division are related, just like addition and subtraction are related.

This is the fact family for 5, 6, and 30:

$5 \times 6 = 30$ $\quad$ $30 \div 6 = 5$

$6 \times 5 = 30$ $\quad$ $30 \div 5 = 6$

Complete each fact family.

1. $2 \times \_\_\_\_ = 10$ $\quad$ $10 \div 5 = \_\_\_\_$

$\_\_\_\_ \times \_\_\_\_ = 10$ $\quad$ $10 \div \_\_\_\_ = \_\_\_\_$

2. $9 \times \_\_\_\_ = 27$ $\quad$ $27 \div 3 = \_\_\_\_$

$\_\_\_\_ \times \_\_\_\_ = 27$ $\quad$ $27 \div \_\_\_\_ = \_\_\_\_$

3. $8 \times \_\_\_\_ = 72$ $\quad$ $72 \div 8 = \_\_\_\_$

$\_\_\_\_ \times \_\_\_\_ = 72$ $\quad$ $72 \div \_\_\_\_ = \_\_\_\_$

4. $6 \times \_\_\_\_ = 48$ $\quad$ $48 \div 8 = \_\_\_\_$

$\_\_\_\_ \times \_\_\_\_ = 48$ $\quad$ $48 \div \_\_\_\_ = \_\_\_\_$

Write a fact family for each set of numbers.

5. 7, 4, 28 _____

_____

6. 5, 8, 40 _____

_____

7. **Number Sense** What multiplication facts are part of the fact family for $12 \div 3 = 4$?

_____

Name _____

Division Facts

R 3-8

Thinking about multiplication facts can help when you want to divide. For example: Sunny and her father are packing oranges. They have 42 oranges. Each crate holds 6 oranges. How many crates do they need?

What You Think	What You Say	What You Write
What number times 6 = 42?	42 divided by 6 is what number?	$42 \div 6 = 7$
$\_\_\_\_ \times 6 = 42$	**or**	**or**
7 times 6 equals 42 $7 \times 6 = 42$	How many times does 6 go into 42?	$6\overline{)42}$ 7

1. $16 \div 2 =$ _____

2. $12 \div 4 =$ _____

3. $50 \div 5 =$ _____

4. $24 \div 8 =$ _____

5. $5\overline{)30}$ _____

6. $7\overline{)49}$ _____

7. $7\overline{)56}$ _____

8. $8\overline{)64}$ _____

9. Reasoning If $66 \div 6 = 11$, what is $66 \div 11$? Explain.

_____

_____

_____

10. A ticket to ride the roller coaster costs $3. How many rides can you get for $15? _____

11. Steve spends $24 on books. Books cost $8 each. How many books did Steve buy? _____

Name _____

Special Quotients

R 3-9

There are special rules for dividing numbers by 1 and by 0.

Rule: A number divided by 1 is that number.

Examples: $4 \div 1 = 4$ $55 \div 1 = 55$

Rule: A number divided by itself (except 0) is 1.

Examples: $17 \div 17 = 1$ $135 \div 135 = 1$

Rule: Zero divided by a number (except 0) is 0.

Examples: $0 \div 4 = 0$ $0 \div 15 = 0$

Rule: You cannot divide a number by zero.

Examples: $7 \div 0$ cannot be done. $12 \div 0$ cannot be done.

1. $0 \div 2 =$ _____

2. $4 \div 4 =$ _____

3. $7\overline{)0}$ _____

4. $9\overline{)9}$ _____

5. $0 \div 3 =$ _____

6. $10\overline{)10}$ _____

7. $11\overline{)0}$ _____

8. $11 \div 1 =$ _____

Compare. Use >, <, or = for each ◯.

9. $6 \div 6$ ◯ $3 \div 3$

10. $7 \div 1$ ◯ $8 \div 8$

11. $0 \div 5$ ◯ $3 \div 1$

12. $0 \div 4$ ◯ $0 \div 9$

13. $5 \div 5$ ◯ $0 \div 5$

14. $7 \div 7$ ◯ $9 \div 9$

15. $8 \div 1$ ◯ $0 \div 8$

16. $9 \div 9$ ◯ $9 \div 1$

17. $0 \div 12$ ◯ $12 \div 1$

18. $0 \div 11$ ◯ $0 \div 15$

19. Number Sense If $a \div b = 0$, what do you know about a?

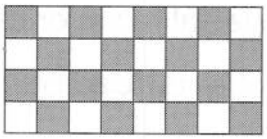
_____

Name _____

Multiplication and Division Stories

R 3-10

Tile Floor Darren is laying a tile floor in the hallway. The pattern for the floor is shown to the right.



First, use Darren's tile floor to write a multiplication story for $4 \times 8 = 32$.

Darren's tile floor has 4 rows with 8 pieces of tile in each row. How many pieces of tile are there in all?

Second, use Darren's tile floor to write a division story for $32 \div 4 = 8$.

Darren has 32 small triangles. He needs 4 for each shaded square. How many shaded squares can he make with the small triangles?

Use the data in the table to write a multiplication or a division story for each number fact. Solve.

Building Supplies	Number in a Box
Fasteners	6
Bolts	12

1. 6×4

_____

_____

_____

2. $12 \div 4$

_____

_____

_____

Name_____

PROBLEM-SOLVING SKILL **R 3-11**

Multiple-Step Problems

Lawn Cutting Chad and his brother Brad cut lawns in their neighborhood to make money. They charge $20 per lawn. One weekend, Brad cut 4 lawns, and Chad cut 3 lawns. How much money did they earn altogether?

Solution One

Hidden Question: How many lawns did they mow altogether?

Chad cut 3 lawns, Brad cut 4 lawns.

$3 + 4 = 7$

They cut 7 lawns.

Question in the Problem: How much money did they earn altogether?

$7 \text{ lawns} \times \$20 = \$140$

Chad and Brad earned $140.

Solution Two

Hidden Question 1: How much money did Chad get for cutting lawns?

$3 \times \$20 = \$60$

Hidden Question 2: How much money did Brad get for cutting lawns?

$4 \times \$20 = \$80$

Question in the Problem: How much money did they earn altogether?

$\$60 + \$80 = \$140$

Chad and Brad earned $140.

Write and answer the hidden question or questions. Then solve the problem. Write your answer in a complete sentence.

1. Keisha sold 8 ribbons. Then she sold 6 pins. The ribbons sold for $3; the pins sold for $2. How much money did Keisha make?

Name _____

Writing and Evaluating Expressions

R 3-12

How to evaluate a multiplication expression:

Evaluate $5n$ for $n = 8$. Remember, $5n$ means the same as $5 \times n$.

First, substitute 8 for n. Then multiply.

$5 \times n = ?$
$5 \times 8 = ?$
$5 \times 8 = 40$

How to evaluate a division expression:

Evaluate $g \div 6$ for $g = 42$.

First, substitute 42 for g. Then divide.

$g \div 6 = ?$
$42 \div 6 = ?$
$42 \div 6 = 7$

How to evaluate expressions with more than one operation:

Evaluate $(4f) + 7$ for $f = 5$.

First, substitute 5 for f. Then do the computations inside the parentheses first.

$(4 \times f) + 7 = ?$
$(4 \times 5) + 7 = ?$
$20 + 7 = 27$

Evaluate each expression for $m = 4$.

1. $6m =$ _____

2. $\frac{m}{2} =$ _____

3. $20 \div m =$ _____

4. $(7m) + 2 =$ _____

5. Number Sense Write an expression that equals 50 for $n = 10$. _____

Evaluate each expression for $w = 7$.

6. $5 \times w =$ _____

7. $7 \div w =$ _____

8. $9w =$ _____

9. $3 \times (2 + w) =$ _____

Evaluate each expression.

10. $8 \times (4 + k)$ for $k = 2$ _____

11. $h \div (6 \times 1)$ for $h = 30$ _____

Name _____

Find a Rule

R 3-13

Complete the table. Start with the number in the **IN** column. What rule tells you how to find the number in the **OUT** column? Write the rule.

IN	OUT
2	10
4	20
6	30
8	
n	

What You **Think**

2 × 5 = 10
4 × 5 = 20
6 × 5 = 30
8 × 5 = 40

A rule is *multiply by 5*.

What You **Write**

IN	OUT
2	10
4	20
6	30
8	40
n	*n* × 5

The rule *multiply by 5* is written as $n \times 5$.

Complete each table. Write the rule.

1.

In	20	25	35	55	*n*
Out	4	5	7		

_____

2.

In	3	5	7	9	*n*
Out	9	15	21		

_____

3.

In	2	5	7	10	*n*
Out	14	35	49		

_____

Name _____

Solving Multiplication and Division Equations

R 3-14

To solve an equation that has a variable you need to test several numbers for the variable. Find the one number that makes the equation true.

Solve the equation $4n = 28$ by testing these values for n: 5, 6, and 7.

Try	$n = 5$	$n = 6$	$n = 7$
Find $4n$	$4 \times 5 = 20$	$4 \times 6 = 24$	$4 \times 7 = 28$
Does $4n = 28$?	No	No	Yes

The solution to the equation is $n = 7$, because $4 \times 7 = 28$.

Solve the equation $g \div 5 = 9$ by testing these values for g: 30, 45, and 60.

Try	$g = 30$	$g = 45$	$g = 60$
Find $g \div 5$	$30 \div 5 = 6$	$45 \div 5 = 9$	$60 \div 5 = 12$
Does $g \div 5 = 9$?	No	Yes	No

The solution to the equation is $g = 45$, because $45 \div 5 = 9$.

Solve each equation by testing these values for k: 2, 4, and 6.

1. $k \div 2 = 3$ _____ **2.** $5k = 30$ _____

3. $36 \div k = 9$ _____ **4.** $8k = 16$ _____

Solve each equation by testing these values for n: 12, 16, and 24.

5. $n \div 6 = 4$ _____ **6.** $n \div 4 = 4$ _____

7. $n \times 2 = 24$ _____ **8.** $n \div 4 = 3$ _____

9. Number Sense What is the value of b in the equation $b \times 7 = 63$? How do you know?

Name _____

PROBLEM-SOLVING APPLICATIONS **R 3-15**

The Party

Alberto is planning a party. He needs to purchase the following items:

How much will Alberto have to spend if he purchases 2 paper tablecloths?

$\$11 + \$11 = \$22$

$2 \times \$11 = \$22$

He will have to spend $22.

Party Supplies

Item	Price
Napkins	$2
Paper plates	$5
Cups	$9
Balloons	$10
Paper tablecloth	$11
Juice	$12

Use the chart above to answer the following questions.

1. Alberto purchased 6 packages of paper plates. The addition sentence that shows how much he spent is $5 + 5 + 5 + 5 + 5 + 5 = 30$. Write the multiplication sentence for this addition sentence.

   _____

2. Since many people are coming to the party, Alberto purchased 9 packages of napkins. Complete the fact family.

   $2 \times$ _____ $= 18$ $\quad$ $18 \div 9 =$ _____

   $18 \div 2 =$ _____ $\quad$ _____ $\times$ _____ $= 18$

How much did Alberto spend on

3. 5 bottles of juice? _____

4. 7 packages of cups? _____

5. 4 packages of paper plates? _____

6. Alberto spent $50 on balloons. How many bags of balloons did he purchase? _____