3

BRIDGES IN MATHEMATICS

GRADE 3 SUPPLEMENT

Set A1 Number & Operations: Equal Expressions

Includes

Skills & Concepts

★ determine whether two expressions are equal and use "=" to denote equality

★ apply strategies to compute multiplication facts to 10 × 10 and the related division facts

★ solve and create word problems that match multiplication or division equations

Bridges in Mathematics Grade 3 Supplement
Set A1 Numbers & Operations: Equal Expressions

Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

The Math Learning Center is a nonprofit organization serving the education community. Our mission is to inspire and enable individuals to discover and develop their mathematical confidence and ability. We offer innovative and standards-based professional development, curriculum, materials, and resources to support learning and teaching. To find out more, visit us at www.mathlearningcenter.org.

Set A1 ★ Activity 1

ACTIVITY

True or False?

Overview

Students work together to evaluate a series of equations, reviewing the meaning of the equals sign in the process. Then they complete a related worksheet independently.

Skills & Concepts

★ determine whether two expressions are equal and use "=" to denote equality

★ apply strategies to compute multiplication facts to 10 × 10 and the related division facts

★ solve and create word problems that match multiplication or division equations

You'll need

★ True or False? (page A1.4, run one copy on a transparency)

★ Number Puzzles (pages A1.5 and A1.6, run a class set)

★ overhead pens

★ a piece of paper to mask portions of the overhead

★ Student Math Journals or 1 piece of lined or grid paper per student

Instructions for True or False?

1. Ask students to find the next available page in their journal and write the numbers 1–12 down the left-hand side of the page. Then display the top portion of the transparency and read the instructions with the class. Ask students to work in silence to give everyone a moment of private "think time", and then reveal the first equation. As soon as they've copied the first equation into their journal and labeled it with a T or and F, have them show the thumbs up sign. When most have finished, ask them to pair-share their responses and then call on volunteers to share their thinking with the class.

Set A1 Number & Operat ons: Equal Expressions B ack ine Run one copy on a transparency.

True or False?

- Copy each of the equations into your journal as your teacher shows them to you.
- Write a T beside the equation if you think it's true and an F if you think it's false.
- If there are any missing numbers, fill them in to make the equation true.

1 10 = 2 × 5   True or False?

Students *I put false because I think that equation is backwards. You're supposed to put the answer after the equals sign, not before it.*
I put true because I don't think it matters. I think it's okay to switch things around.
I agree. 2 × 5 is 10 no matter what, even if it's backwards in that equation.
I wasn't really sure what to put. It does seem kind of backwards.

2. As students share, you may discover that some of them regard the equals sign as an "operator button," similar to the equals key on the calculator, or as a symbol used to separate the problem from its answer. A few may feel that writing the "answer" first is backwards. The equations on this overhead are in-

Activity 1 True or False? (cont.)

tended to review the idea that the equals sign stands between two expressions to indicate that they have the same value; they mean the same thing. 10 and 2 × 5 are, in fact expressions of equal value, and can be placed on either side of the equals sign.

3. Explain this idea to your students. One way to help them think appropriately about the equals sign is to read the sentence as, "10 is the same as 2 × 5" rather than "10 equals 2 × 5". It will be helpful if you use this language yourself and ask students to do so throughout the activity. After some discussion, circle the word "true" next to equation 1 on the overhead, and then reveal the next equation. Repeat the process described above. As students share their thinking, ask them to consider whether or not the expressions on either side of the equals sign have the same value.

4. Work through problems 3 through 8 in this fashion, marking the answers to each after students have shared their thinking. Problem h shows a "run-on sentence".

This (false) equation illustrates an error students frequently make in dealing with more than one operation. In this case, the root combination was 2 + 4 + 9. It's not unusual to see students carry an equivalence from a previous expression into a new expression with an additional operation. Take a little extra time to have students examine and discuss this equation. Some may argue that it's partly true because 2 + 4 = 6 and 6 + 9 = 15, while others will either be baffled by the equation or argue that it is false because 2 + 4 does not equal 6 + 9. Be sure they understand that it is incorrect.

5. Starting with problem 9, students will need to fill in a missing number to make the equation true. Problem 12 may spark some debate until students realize that there are many possible solutions, including the one shown below.

6. When the class has completed the overhead, give students each a copy of Number Puzzles. Review the instructions on both sheets with the class, and clarify as needed. When students understand what to do, let them go to work. Give assistance as needed, but encourage children to support one another in finding the solutions to these problems as they work.

Activity 1 True or False? (cont.)

NAME _____ DATE _____

Number Puzzles page 1 of 2

1 Read each of the equations below. If it is true, circle the T. If it is false, circle the F.

a $18 = 9 \times 2$ T   F   **e** $5 = 10 \div 2$ T   F

b $6 \times 10 = 12$ T   F   **f** $3 \times 2 = 12 \div 2$ T   F

c $2 \times 4 = 4 \times 2$ T   F   **g** $2 \times 3 = 6 \times 5 = 30$ T   F

d $2 \times 8 = 4 \times 4$ T   F   **h** $100 \div 2 = 25 \times 2$ T   F

2 Fill in the missing numbers to make each equation true.

a $16 = 4 \times \boxed{}$ **g** $25 \div 1 = \boxed{}$

b $2 \times \boxed{} = 4 \times 5$ **h** $60 = \boxed{} \times 6$

c $\boxed{} \times 10 = 30$ **i** $12 \div 3 = 6 \times \boxed{}$

d $12 \div 2 = \boxed{}$ **j** $18 \div 2 = \boxed{} \times 3$

e $20 \div \boxed{} = 4$ **k** $10 \times 10 = 50 \times \boxed{}$

f $\boxed{} \div 5 = 5$ **l** $10 \times 10 = 25 \times \boxed{}$

NAME _____ DATE _____

Number Puzzles page 2 of 2

3 Sara has 3 bags of shells. Each bag has 10 shells in it. Her brother Max has 5 bags of shells. Each bag has 6 shells in it.

Do Sara and Max have the same number of shells? _____

Use labeled sketches, numbers, and/or words to prove your answer.

4 Jan and Jess split 10 dollars evenly. Jody, Jamal, and Jasmin split 12 dollars evenly.

Did all the kids get the same amount of money? _____

Use labeled sketches, numbers, and/or words to prove your answer.

5 Write a word problem to go with each of the equations below.

a $3 \times 5 = 15$	**b** $20 \div 4 = 5$

INDEPENDENT WORKSHEET

Use Set A1 Independent Worksheets 1 and 2 to provide students with more practice determining whether two expressions are equal, using "=" to denote equality, applying strategies to compute multiplication and related division facts, and solving and creating word problems that match multiplication and division expressions and equations.

True or False?

- Copy each of the equations into your journal as your teacher shows them to you.
- Write a T beside the equation if you think it's true and an F if you think it's false.
- If there are any missing numbers, fill them in to make the equation true.

1 $10 = 2 \times 5$ True or False?

2 $3 \times 4 = 4 \times 3$ True or False?

3 $4 \times 5 = 10 \times 3$ True or False?

4 $2 \times 6 = 3 \times 4$ True or False?

5 $15 \div 3 = 2 \times 4$ True or False?

6 $2 \times 2 = 10 \div 2$ True or False?

7 $10 \div 2 = 15 \div 3$ True or False?

8 $2 + 4 = 6 + 9 = 15$ True or False?

9 $14 = 2 \times \boxed{}$

10 $12 \div 2 = 2 \times \boxed{}$

11 $1 \times \boxed{} = 14 \div 2$

12 $2 \times \boxed{} = \boxed{}$

Number Puzzles page 1 of 2

1 Read each of the equations below. If it is true, circle the T. If it is false, circle the F.

a $18 = 9 \times 2$ T F

e $5 = 10 \div 2$ T F

b $6 \times 10 = 12$ T F

f $3 \times 2 = 12 \div 2$ T F

c $2 \times 4 = 4 \times 2$ T F

g $2 \times 3 = 6 \times 5 = 30$ T F

d $2 \times 8 = 4 \times 4$ T F

h $100 \div 2 = 25 \times 2$ T F

2 Fill in the missing numbers to make each equation true.

a $16 = 4 \times \boxed{}$

g $25 \div 1 = \boxed{}$

b $2 \times \boxed{} = 4 \times 5$

h $60 = \boxed{} \times 6$

c $\boxed{} \times 10 = 30$

i $36 \div 3 = 6 \times \boxed{}$

d $12 \div 2 = \boxed{}$

j $18 \div 2 = \boxed{} \times 3$

e $20 \div \boxed{} = 4$

k $10 \times 10 = 50 \times \boxed{}$

f $\boxed{} \div 5 = 5$

l $10 \times 10 = 25 \times \boxed{}$

(Continued on next page.)

NAME _____   DATE _____

Number Puzzles page 2 of 2

3 Sara has 3 bags of shells. Each bag has 10 shells in it. Her brother Max has 5 bags of shells. Each bag has 6 shells in it.

Do Sara and Max have the same number of shells? _____

Use labeled sketches, numbers, and/or words to prove your answer.

4 Jan and Jess split 10 dollars evenly. Jody, Jamal, and Jasmin split 12 dollars evenly.

Did all the kids get the same amount of money? _____

Use labeled sketches, numbers, and/or words to prove your answer.

5 Write a word problem to go with each of the equations below.

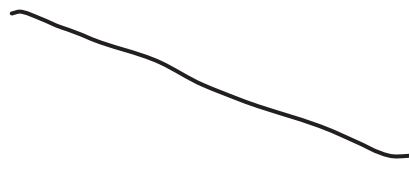| **a** $3 \times 5 = 15$	**b** $20 \div 4 = 5$

NAME _____   DATE _____

Set A1 ★ Independent Worksheet 1

INDEPENDENT WORKSHEET

More Number Puzzles

1 Draw a line from each expression on the left to the matching expression on the right.

example 3×5	5×1
a 6×10	2×8
b $20 \div 4$	$30 \div 2$
c 16×1	2×4
d $24 \div 3$	15×2
e 6×4	8×3
f 6×5	2×30

2 Write an equal (=), greater than (>), or less than (<) sign in the circles to make each equation true.

example $2 \times 5 \; \bigcirc{<} \; 3 \times 4$

a $12 \div 4 \; \bigcirc \; 3 \times 1$ **b** $5 \times 1 \; \bigcirc \; 12 \div 3$ **c** $8 \times 2 \; \bigcirc \; 4 \times 4$

d $25 \div 5 \; \bigcirc \; 4 \times 2$ **e** $8 \times 4 \; \bigcirc \; 12 \times 2$ **f** $20 \div 2 \; \bigcirc \; 3 \times 5$

3 Dani says you can show the solution to $2 \times 5 \times 3$ with one equation:
$2 \times 5 = 10 \times 3 = 30$

Maya says you have to use two equations: $2 \times 5 = 10, 10 \times 3 = 30$

Which girl is correct? _____   Explain your answer.

(Continued on back.)

Independent Worksheet 1 More Number Puzzles (cont.)

4 Andy had 30 marbles. He gave half of his marbles to his 3 cousins. His 3 cousins divided the marbles equally.

Jan had 48 marbles. She gave half of her marbles to her 4 cousins. Her 4 cousins divided the marbles equally.

Whose cousins got more marbles, Andy's cousins or Jan's cousins? _____

Use labeled sketches, numbers, and/or words to prove your answer.

5 Circle the expression that best represents this problem. Then find the answer. Show your work.

Tim went to the pet store. He saw 3 cages of mice. There were 4 mice in each cage. He also saw 2 cages of hamsters. There were 6 hamsters in each cage. How many animals did Tim see in all?

$(3 \times 2) + (6 \times 4)$ $\qquad\qquad$ $(3 \times 4) + (2 \times 6)$ $\qquad\qquad$ $(4 \times 1) + (2 \times 3)$

CHALLENGE

6 Use the digits 0–9 each just one time. Write them in the boxes below. Make each multiplication problem correct.

0   1   2   3   4   5   6   7   8   9

© The Math Learning Center

NAME _____   DATE _____

Set A1 ★ Independent Worksheet 2

▨ **INDEPENDENT WORKSHEET**

Expressions, Equations & Word Problems

1 Read each of the equations below. If it is true, circle the T. If it is false, circle the F.

a $12 = 24 \div 3$ T   F   **d** $7 \times 3 = 3 \times 7$ T   F

b $4 \times 6 = 12 \times 2$ T   F   **e** $32 \div 8 = 3 \times 2$ T   F

c $5 \times 3 = 15 \div 3$ T   F

2 Circle the expression that best represents each word problem below. Then find the answer.

a Jason had 15 carrots. He divided them equally among his 3 rabbits.

    15×3 $15 + 3$ $15 - 3$ $15 \div 3$

Each rabbit got _____ carrots.

b Sara had 3 dogs. She gave them each 6 dog treats. How many treats did she give them in all?

    3×6 $18 \div 3$ $3 + 6$ $6 - 3$

Sara gave her dogs _____ treats in all.

⚡ **CHALLENGE**

c Jenny was making a fruit plate. She had 6 apples and 7 pears. She cut each piece of fruit into 8 slices. How many slices of fruit did Jenny cut altogether?

$6 \times 7 \times 8$ $(6 \times 8) + (7 \times 8)$ $(7 \times 8) - (6 \times 8)$

Jenny cut _____ slices of fruit altogether?

Independent Worksheet 2 Expressions, Equations & Word Problems (cont.)

3 Write a word problem to match each of the expressions below. Then find the answer.

a 24 × 2

The answer is _____.

b 25 ÷ 5

The answer is _____.

⚡ **CHALLENGE**

c (4 × 5) + (3 × 7)

The answer is _____.

4 Use the digits 0–9 each just one time. Write them in the boxes below. Make each multiplication problem correct.

0   1   2   3   4   5   6   7   8   9

$$\begin{array}{r} \square \\ \times\ \square \\ \hline \boxed{2}\ \boxed{4} \end{array} \qquad \begin{array}{r} \boxed{3} \\ \times\ \square \\ \hline \boxed{1}\ \square \end{array} \qquad \begin{array}{r} \boxed{3} \\ \times\ \square \\ \hline \boxed{2}\ \square \end{array} \qquad \begin{array}{r} \square \\ \times\ \boxed{2} \\ \hline \square\ \boxed{0} \end{array} \qquad \begin{array}{r} \square \\ \times\ \boxed{5} \\ \hline \boxed{3}\ \square \end{array}$$