



LESSON 8.1a  
**First Among Equals**

Objective Reasoning with Equal Expressions

**Warm-Up**



Rewrite each number as an addition, subtraction, multiplication, or division expression.  
Use each operation once.

1. 24

2.  $\frac{1}{2}$

3. 0

4. 100

## GETTING STARTED

The Same But Different

1. Write different expressions equal to 4.

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

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

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

2. Now write different expressions equal to  $4 + 5$ .

$$4 + 5 = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} = 4 + 5$$

$$4 + 5 = \underline{\hspace{2cm}}$$

3. What can you do to one of the expressions you wrote in Question 1 to make it equal to one of the expressions you wrote in Question 2?



An equation is a statement of equality between two expressions.

An equation can contain numbers, variables, or both in the same mathematical sentence.

Consider the equation  $8 + 4 = \underline{\quad} + 5$ . It has an unknown number.

One way to determine the unknown number is to rewrite the expressions on both sides of the equals sign until they match.

Consider each reasoning strategy that is used to determine the unknown number in  $8 + 4 = \underline{\quad} + 5$ .

Rylee



The equal sign tells me to perform the operation on the left in the equation  $8 + 4 = \underline{\quad} + 5$ .

$$8 + 4 = 12 + 5$$

$$12 + 5 = 17$$

Therefore, the unknown number is 17.

Clover



I can determine the unknown number in  $8 + 4 = \underline{\quad} + 5$  by rewriting the expression on the left. I can take 1 from 8 and give it to the 4 and keep the value of the expression the same.

$$(8 - 1) + (4 + 1) = \underline{\quad} + 5$$

$$7 + 5 = \underline{\quad} + 5$$

Therefore, the unknown number is 7.

Fiona



I can determine the unknown number in  $8 + 4 = \underline{\quad} + 5$  by rewriting both expressions.

$$8 + 4 = \underline{\quad} + 1 + 4$$

$$7 + 1 + 4 = \underline{\quad} + 1 + 4$$

Therefore, the unknown number is 7.

1. What is the unknown number in the equation  $8 + 4 = \underline{\hspace{1cm}} + 5$ ?  
Explain how this makes sense.

2. Explain the error in Rylee's reasoning.

3. How are Clover's reasoning and Fiona's reasoning similar?  
How are they different?

4. Consider the equation  $31 + 67 = \underline{\hspace{2cm}} + 12$ .

a. Determine the unknown number by rewriting the expressions on either side of the equals sign until they match.

b. How can you check your answer to make sure it is correct?

c. What number property or properties did you use when determining the unknown number?

5. Use your number sense reasoning to determine each unknown number. Show your work.

a.  $85 + 45 = \underline{\hspace{2cm}} + 60$

b.  $9 + 23 = \underline{\hspace{2cm}} + 14$

**LESSON 8.1a**  
**First Among Equals**

Objective

Reasoning with Equal Expressions

**I. Order of Operations and Simplifying Numeric Expressions****A. Simplify each expression.**

1.  $20 - 5 \times 3 + 4 \div 4$

2.  $14 \times 2 - 12 \div 2 \div 2 + 4$

3.  $3 \times 9 - (9 + 0) \div 3 \times 9$

4.  $5 + 10 \div 2 - 6 \times 1$

5.  $6 - 4 \div 2 + 5 \times 3$

6.  $25 \times 6 - 3 - 4 \div 2$

7.  $8 + 7 \times 2 - 15 \div 5$

8.  $24 \div 6 + 3 \times 3 - 7$

9.  $18 - 2 \times 4 \times 2 + 10 \div 2$

10.  $9 \div 3 - 1 + 8 \times 7 - 16$

11.  $10 + 18 \div 3 \div 2 - 3 \times 4$

12.  $36 \div 12 + 9 \times 3 - 12$