LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

# WarmUp

$24\overline{)1104}$ $91\overline{)4823}$

$57\overline{)912}$ $20\overline{)680}$

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

# WarmUpAnswers

$$24\overline{)1104} \quad 46$$

$$91\overline{)4823} \quad 53$$

$$57\overline{)912} \quad 16$$

$$20\overline{)680} \quad 34$$

**September 8, 2014 Period 5 Lesson 1.3**

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

# HomeworkAnswers

## 1.2 Record and Practice Journal

**Write the product as a power.**

1. $5 \times 5 \times 5$
   $5^3$
2. $13 \times 13$
   $13^2$
3. $8 \bullet 8 \bullet 8 \bullet 8 \bullet 8 \bullet 8$
   $8^6$
4. $12 \bullet 12 \bullet 12 \bullet 12 \bullet 12$
   $12^5$
5. $10 \bullet 10 \bullet 10 \bullet 10$
   $10^4$
6. $17 \times 17 \times 17$
   $17^3$

**Find the value of the power.**

7. $4^4$
   256
8. $9^3$
   729
9. $24^2$
   576

**Determine whether the number is a perfect square.**

10. 47
    no
11. 16
    yes
12. 121
    yes

13. You complete 3 centimeters of a necklace in an hour. Each hour after the first, you triple the length of the necklace. Write an expression using exponents for the length of the necklace after 3 hours. Then find the length.
    $3^3$; 27 cm

**September 8, 2014 Period 5 Lesson 1.3**

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

Lesson 1.3

September 8, 2014

**Essential Question** What is the effect of inserting parentheses into a numerical expression?

Lesson 1.3 September 8, 2014

# LessonObjective:

Students will be able to:

use the order of operaons to evaluate a numerical expression.

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

# Self-EvaluationScale

| Score | Description |
|---|---|
| 4 | I can teach other students how to use the order of operaons to evaluate a numerical expression. |
| 3 | I can use the order of operaons to evaluate a numerical expression. |
| 2 | I recognize, but sll need help to use the order of operaons to evaluate a numerical expression. |
| 1 | I do not know how to use the order of operaons to evaluate a numerical expression. |

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

# Activity1&2

With a partner, work on Acvity 1 & 2 on pages 11 & 12 of your Big Ideas Record and Pracce Journal.

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

**1 ACTIVITY:** Comparing Different Orders

**Work with a partner. Find the value of the expression by using different orders of operations. Are your answers the same? (Circle *yes* or *no*.)**

**a.** Add, then multiply. Multiply, then add. Same?

$3 + 4 \times 2 =$ _____ $3 + 4 \times 2 =$ _____ Yes No

**b.** Add, then subtract. Subtract, then add. Same?

$5 + 3 - 1 =$ _____ $5 + 3 - 1 =$ _____ Yes No

**c.** Divide, then multiply. Multiply, then divide. Same?

$12 \div 3 \bullet 2 =$ _____ $12 \div 3 \bullet 2 =$ _____ Yes No

**d.** Divide, then add. Add, then divide. Same?

$16 \div 4 + 4 =$ _____ $16 \div 4 + 4 =$ _____ Yes No

**e.** Multiply, then subtract. Subtract, then multiply. Same?

$8 \times 4 - 2 =$ _____ $8 \times 4 - 2 =$ _____ Yes No

**f.** Multiply, then divide. Divide, then multiply. Same?

$8 \bullet 4 \div 2 =$ _____ $8 \bullet 4 \div 2 =$ _____ Yes No

**g.** Subtract, then add. Add, then subtract. Same?

$13 - 4 + 6 =$ _____ $13 - 4 + 6 =$ _____ Yes No

**h.** Multiply, then add. Add, then multiply. Same?

$1 \times 2 + 3 =$ _____ $1 \times 2 + 3 =$ _____ Yes No

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

## 2 ACTIVITY: Using Parentheses

**Work with a partner. Use all the symbols and numbers to write an expression that has the given value.**

| | *Symbols and Numbers* | *Value* | *Expression* |
|---|---|---|---|
| **a.** | ( ), +, ÷, 3, 4, 5 | 3 | _____ |
| **b.** | ( ), −, ×, 2, 5, 8 | 11 | _____ |
| **c.** | ( ), ×, ÷, 4, 4, 16 | 16 | _____ |
| **d.** | ( ), −, ÷, 3, 8, 11 | 1 | _____ |
| **e.** | ( ), +, ×, 2, 5, 10 | 70 | _____ |

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

# NumericalExpression

an expression that contains only numbers and operaons

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

# Evaluate

to find the value of

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

# OrderofOperations

a set of rules to evaluate a mathemacal expression

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

# P.E.M.D.A.S.

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

## Key Idea

**Order of Operations**

1. Perform operations in **P**arentheses.
2. Evaluate numbers with **E**xponents.
3. **M**ultiply or **D**ivide from left to right.
4. **A**dd or **S**ubtract from left to right.

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

## 1 Using Order of Operations

**a. Evaluate $12 - 2 \times 4$.**

$12 - 2 \times 4 = 12 - 8$ Multiply 2 and 4.

$= 4$ Subtract 8 from 12.

**b. Evaluate $7 + 60 \div (3 \times 5)$.**

$7 + 60 \div (3 \times 5) = 7 + 60 \div 15$ Perform operation in parentheses.

$= 7 + 4$ Divide 60 by 15.

$= 11$ Add 7 and 4.

$$12 - 2 \times 4$$
$$12 - 8$$
$$4$$

$$7 + 60 \div (3 \cdot 5)$$
$$7 + 60 \div 15$$
$$7 + 4$$
$$11$$

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

## 2 Using Order of Operations with Exponents

**Evaluate $30 \div (7 + 2^3) \times 6$.**

Evaluate the power in parentheses first.

$$30 \div (7 + 2^3) \times 6 = 30 \div (7 + 8) \times 6 \quad \text{Evaluate } 2^3.$$

$$= 30 \div 15 \times 6 \quad \text{Perform operation in parentheses.}$$

$$= 2 \times 6 \quad \text{Divide 30 by 15.}$$

$$= 12 \quad \text{Multiply 2 and 6.}$$

$$30 \div (7 + 2^3) \times 6$$
$$30 \div (7 + 8) \times 6$$
$$30 \div 15 \times 6$$
$$2 \times 6$$
$$12$$

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

# OnYourOwn

**Evaluate the expression.**

**1.** $7 \cdot 5 + 3$

**2.** $(28 - 20) \div 4$

**3.** $6 \times 15 - 10 \div 2$

**4.** $6 + 2^4 - 1$

**5.** $4 \cdot 3^2 + 18 - 9$

**6.** $16 + (5^2 - 7) \div 3$

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

## 3 Using Order of Operations

**a. Evaluate $9 + 7(5 - 2)$.**

$$9 + 7(5 - 2) = 9 + 7(3)$$ Perform operation in parentheses.

$$= 9 + 21$$ Multiply 7 and 3.

$$= 30$$ Add 9 and 21.

**b. Evaluate $15 - 4(6 + 1) \div 2^2$.**

$$15 - 4(6 + 1) \div 2^2 = 15 - 4(7) \div 2^2$$ Perform operation in parentheses.

$$= 15 - 4(7) \div 4$$ Evaluate $2^2$.

$$= 15 - 28 \div 4$$ Multiply 4 and 7.

$$= 15 - 7$$ Divide 28 by 4.

$$= 8$$ Subtract 7 from 15.

$$15 - 4(6+1) \div 2^2$$
$$15 - 4(7) \div 2^2$$
$$15 - 4(7) \div 4$$
$$15 - 28 \div 4$$
$$15 - 7$$
$$8$$

$$9 + 7(5-2)$$

$$9 + 7(3)$$

$$9 + 21$$

$$30$$

$7(5-2)$

$35-14$

$21$

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

# OnYourOwn

**Evaluate the expression.**

**7.** $50 + 6(12 \div 4) - 8^2$ **8.** $5^2 - 5(10 - 5)$ **9.** $\frac{8(3 + 4)}{7}$

**10.** **WHAT IF?** In Example 4, you add the dwarf planet Pluto to your model. Use a verbal model to find your total cost assuming you do not need more paint. Explain.

9. $\frac{8(3+4)}{7+7}$

$(8(3+4)) \div (7+7)$

$\frac{8 \cdot 7}{7} = 8$

$\frac{56}{7}$

$(8)$

**7.** $50 + 6(12 \div 4) - 8^2$

$50 + 6(3) - 8^2$

$50 + 6(3) - 64$

$50 + 18 - 64$

$68 - 64$

$4$

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

# Assignment

Complete problems 6, 10, 14, 18, 19, & 30 on pages 20 & 21 in your Big Ideas Text Book.

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

Lesson 1.3

September 8, 2014

**Essential Question** What is the effect of inserting parentheses into a numerical expression?

Lesson 1.3 September 8, 2014

# LessonObjective:

Students will be able to:

use the order of operaons to evaluate a numerical expression.

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

# Self-EvaluationScale

| Score | Description |
|---|---|
| 4 | I can teach other students how to use the order of operaons to evaluate a numerical expression. |
| 3 | I can use the order of operaons to evaluate a numerical expression. |
| 2 | I recognize, but sll need help to use the order of operaons to evaluate a numerical expression. |
| 1 | I do not know how to use the order of operaons to evaluate a numerical expression. |

LearningObjective: Students will be able to use the order of operaons to evaluate a numerical expression.

# Homework

In your Big Ideas Record and Pracce Journal page 14.