

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

# Warm Up

$$24 \overline{)1104}$$

$$91 \overline{)4823}$$

$$57 \overline{)912}$$

$$20 \overline{)680}$$

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

DMSB

# Warm Up Answers

$$\begin{array}{r} \overset{1}{2}4 \\ \times 4 \\ \hline 96 \\ \overset{2}{2}4 \\ \times 6 \\ \hline 144 \end{array}$$

$$\begin{array}{r} \overset{80}{24} \overset{46}{104} \\ 24 \overline{) 1104} \\ \underline{-960} \\ 144 \\ \underline{-144} \\ 0 \end{array}$$

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

$$\begin{array}{r} \overset{00}{91} \overset{53}{4823} \\ 91 \overline{) 4823} \\ \underline{-4550} \\ 273 \\ \underline{-273} \\ 0 \end{array}$$

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

$$\begin{array}{r} 91 \\ \times 5 \\ \hline 455 \end{array}$$

$$\begin{array}{r} 91 \\ \times 3 \\ \hline 273 \end{array}$$

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

# I 1.2 Record and Practice Journal

$$4 \cdot 4 \cdot 4 \cdot 4$$

$$\begin{array}{r} 16 \\ \times 4 \\ \hline 64 \\ 4 \\ \hline 256 \end{array}$$

$$8 \cdot 8 \cdot 8$$

$$\begin{array}{r} 9 \\ \times 3 \\ \hline 27 \end{array}$$

Write the product as a power.

1.  $5 \times 5 \times 5$   
 $5^3$

2.  $13 \times 13$   
 $13^2$

3.  $8 \cdot 8 \cdot 8 \cdot 8 \cdot 8 \cdot 8$   
 $8^6$

4.  $12 \cdot 12 \cdot 12 \cdot 12 \cdot 12$   
 $12^5$

5.  $10 \cdot 10 \cdot 10 \cdot 10$   
 $10^4$

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

$$\begin{array}{r} 9 \cdot 9 \cdot 9 \\ 81 \\ \times 9 \\ \hline 729 \end{array}$$

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

Lesson 1.3

September 11, 2014

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

## Lesson Objective:

Students will be able to:

use the order of operations to evaluate a numerical expression.

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

# Self-Evaluation Scale

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

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

# Activity 1 & 2

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

## September 12, 2014 Period 3 Lesson 1.3

Learning Objective: Students will be able to use the order of operations 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?  
 $3 + 4 \times 2 = \underline{\quad}$        $3 + 4 \times 2 = \underline{\quad}$       Yes    No

b. Add, then subtract.      Subtract, then add.      Same?  
 $5 + 3 - 1 = \underline{\quad}$        $5 + 3 - 1 = \underline{\quad}$       Yes    No

c. Divide, then multiply.      Multiply, then divide.      Same?  
 $12 \div 3 \cdot 2 = \underline{\quad}$        $12 \div 3 \cdot 2 = \underline{\quad}$       Yes    No

d. Divide, then add.      Add, then divide.      Same?  
 $16 \div 4 + 4 = \underline{\quad}$        $16 \div 4 + 4 = \underline{\quad}$       Yes    No

e. Multiply, then subtract.      Subtract, then multiply.      Same?  
 $8 \times 4 - 2 = \underline{\quad}$        $8 \times 4 - 2 = \underline{\quad}$       Yes    No

f. Multiply, then divide.      Divide, then multiply.      Same?  
 $8 \cdot 4 \div 2 = \underline{\quad}$        $8 \cdot 4 \div 2 = \underline{\quad}$       Yes    No

g. Subtract, then add.      Add, then subtract.      Same?  
 $13 - 4 + 6 = \underline{\quad}$        $13 - 4 + 6 = \underline{\quad}$       Yes    No

h. Multiply, then add.      Add, then multiply.      Same?  
 $1 \times 2 + 3 = \underline{\quad}$        $1 \times 2 + 3 = \underline{\quad}$       Yes    No



## September 12, 2014 Period 3 Lesson 1.3

*Learning Objective:* Students will be able to use the order of operations 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.

<i>Symbols and Numbers</i>	<i>Value</i>	<i>Expression</i>
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	_____

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

# Numerical Expression

an expression that contains only numbers  
and operations

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

# Evaluate

to find the value of

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

# Order of Operations

a set of rules to evaluate a mathematical expression

$$3 + 5 \times 6$$
$$3 + 30$$
$$(33)$$

September 12, 2014 Period 3 Lesson 1.3

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

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



Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

PEMDAS

## 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.

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

1

## Using Order of Operations

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

$$\begin{aligned} 12 - 2 \times 4 &= 12 - 8 \\ &= 4 \end{aligned}$$

Multiply 2 and 4.

Subtract 8 from 12.

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

$$\begin{aligned} 7 + 60 \div (3 \times 5) &= 7 + 60 \div 15 \\ &= 7 + 4 \\ &= 11 \end{aligned}$$

Perform operation in parentheses.

Divide 60 by 15.

Add 7 and 4.

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

$$7 + 60 \div 15$$

$$7 + 4$$

$$\textcircled{11}$$



Evaluate  $12 - 2 \times 4$ .

$$12 - 8$$

$$\textcircled{4}$$

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Homework

$$56 \overline{)2968}$$

$$94 \overline{)3854}$$

$$84 \overline{)8232}$$

$$33 \overline{)792}$$

$$18 \overline{)702}$$

$$21 \overline{)1743}$$

$$28 \overline{)364}$$

$$22 \overline{)1672}$$

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

$$\begin{array}{r} 1 \\ 56 \\ \hline 168 \end{array}$$

$$\begin{array}{r} 3 \\ 56 \\ \times 5 \\ \hline 280 \end{array}$$

# Homework

DMSB

$$\begin{array}{r} 0053 \\ 56 \overline{)2968} \\ \underline{-2800} \phantom{0} \\ 168 \\ \underline{-168} \\ 0 \end{array}$$

$$\begin{array}{r} 94 \\ \times 4 \\ \hline 376 \end{array}$$

$$\begin{array}{r} 0041 \\ 94 \overline{)3854} \\ \underline{-3760} \phantom{0} \\ 94 \phantom{0} \\ \underline{-94} \\ 0 \end{array}$$

$$\begin{array}{r} 0698 \\ 84 \overline{)8132} \\ \underline{-7560} \phantom{0} \\ 672 \\ \underline{-672} \\ 0 \end{array}$$

$$\begin{array}{r} 75 \\ 67 \overline{)500} \\ \underline{-402} \phantom{0} \\ 98 \\ \underline{-98} \\ 0 \end{array}$$

$$\begin{array}{r} 24 \\ 33 \overline{)792} \end{array}$$

$$\begin{array}{r} 39 \\ 18 \overline{)702} \end{array}$$

$$\begin{array}{r} 83 \\ 21 \overline{)1743} \end{array}$$

$$\begin{array}{r} 13 \\ 28 \overline{)364} \end{array}$$

$$\begin{array}{r} 76 \\ 22 \overline{)1672} \end{array}$$

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

Lesson 1.3

September 12, 2014

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

## Lesson Objective:

Students will be able to:

use the order of operations to evaluate a numerical expression.

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

# Self-Evaluation Scale

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

Learning Objective: Students will be able to use the order of operations 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.

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

$$= 30 \div 15 \times 6$$

$$= 2 \times 6$$

$$= 12$$

Evaluate  $2^3$ .

Perform operation in parentheses.

Divide 30 by 15.

Multiply 2 and 6.

PEMDAS

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

$$30 \div (7 + 8) \times 6$$

$$30 \div 15 \times 6$$

$$2 \times 6$$

12



Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

# On Your Own

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

$$16 + (25 - 7) \div 3$$

$$16 + 18 \div 3$$

$$16 + 6$$

$$\textcircled{22}$$

$$4 \cdot 3^2 + 18 - 9$$

$$4 \cdot 9 + 18 - 9$$

$$36 + 18 - 9$$

$$54 - 9$$

$$45$$

$$6 + 2^4 - 1$$

$$6 + 16 - 1$$

$$22 - 1$$

$$\textcircled{21}$$

$$6 \times 15 - 10 \div 2$$

$$90 - 5$$
$$\textcircled{85}$$

$$(28 - 20) \div 4$$

$$8 \div 4$$

$$\textcircled{2}$$

$$7 \cdot 5 + 3$$

$$35 + 3$$

$$38$$

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

3

## Using Order of Operations

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

$$\begin{aligned}9 + 7(5 - 2) &= 9 + 7(3) \\ &= 9 + 21 \\ &= 30\end{aligned}$$

Perform operation in parentheses.

Multiply 7 and 3.

Add 9 and 21.

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

$$\begin{aligned}15 - 4(6 + 1) \div 2^2 &= 15 - 4(7) \div 2^2 \\ &= 15 - 4(7) \div 4 \\ &= 15 - 28 \div 4 \\ &= 15 - 7 \\ &= 8\end{aligned}$$

Perform operation in parentheses.

Evaluate  $2^2$ .

Multiply 4 and 7.

Divide 28 by 4.

Subtract 7 from 15.

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

$$15 - 4 \cdot 7 \div 2^2$$

$$15 - 4 \cdot 7 \div 4$$

$$15 - 28 \div 4$$

$$15 - 7$$

$$8$$



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

$$9 + 7(3)$$

$$\begin{array}{l} 9 + 7 \cdot 3 \\ 9 + 21 \\ (30) \end{array}$$

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

# On Your Own

**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.

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

Lesson 1.3

September 12, 2014

**Essential Question**

into a numerical expression?

What is the effect of inserting parentheses

## Lesson Objective:

Students will be able to:

use the order of operations to evaluate a numerical expression.

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

# Self-Evaluation Scale

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

Learning Objective: Students will be able to use the order of operations to evaluate a numerical expression.

# Homework

## No Homework