lesson one - student resource sheet

Lesson Objective: Apply the order of operations to evaluate expressions.

Vocabulary Box

evaluate – Substitute number values into; find a numerical expression for. Example: The expression $x + 5$ evaluated for $x = 2$ gives a value of 7.

Guided Practice

I. Directions: Evaluate each expression when $y = 9$ and $z = 6$.

1. $2 + z^2$

2. $(2 + z)^2$

3. $5 + y(z - 4)$

4. $(5 + y)(z - 4)$

5. $3y^2$

6. $(3y)^2$

7. Write a few sentences contrasting problem 1 with problem 2, problem 3 with problem 4, and problem 5 with problem 6. *(Answers will vary but should discuss how parentheses affect the order of operations.)*

II. Directions: Evaluate each expression when a = $\frac{2}{3}$ and b = $-\frac{3}{4}$.

1. 4b + 3a

2. b + ab

Summary/Closure

A. Vocabulary Words
Directions: Fill in each blank to make a true statement.

1. The root word of the word *evaluate* is _____.

2. We evaluate an algebraic expression by _____ number values for the variables.

3. When we evaluate expressions, we must follow the _____.

B. Summarize What We Learned Today
Directions: Write three sample problems about evaluating expressions like the ones we learned today. Be sure that your examples cover the breadth of the order of operations. Then write a few sentences explaining how to evaluate expressions using the order of operations. You will use this explanation as a personal reminder.

lesson two - student resource sheet

Lesson Objective: Apply the order of operations to evaluate expressions.

Vocabulary Box

evaluate – Substitute number values into; find a numerical expression for. Example: The expression x + 5 evaluated for x = 2 gives a value of 7.

Complete the following practice problems on your own. Your teacher will review the answers. Make sure that you show all of your work.

Directions: Evaluate each expression for a = 7, b = 4, and c = –1.

1. a – b + c

2. a – (b + c)

3. 4a – c

4. 4(a – c)

5. a + b(b + c)

6. (a + b)(b + c)

7. cb^2

8. $(cb)^2$

9. $a^2 + c^2$

10. $a^2 - c^2$

11. $b + 2c^2$

12. $b - 2c^2$

Directions: Evaluate the following expressions for w = –4, x = 12, y = –3, and z = –6.

1. $\frac{xz}{wy}$

2. $100 - (w - (x - (y - z)))$

3. $\frac{(y+z)(y-z)}{y^2 - z^2}$

Problem Solving

Terry chose not to take an algebra skills review course and forgot how to follow the order of operations. For each problem below, Terry's incorrect answer is listed. Find exactly what Terry did wrong. Then work the problem correctly.

$16 - 4 \bullet 2$ Terry's answer: 24 What Terry did wrong:	Correct way to do $16 - 4 \bullet 2$:
$9 - 5(7 - 3)$ Terry's answer: 16 What Terry did wrong:	Correct way to do $9 - 5(7 - 3)$:
Evaluate $5z^2$ for $z = 3$. Terry's answer: 225 What Terry did wrong:	Correct way to evaluate $5z^2$ for $z = 3$:
Evaluate $-3x^2 - 4y^2$ for $x = 2$ and $y = -2$. Terry's answer: 4 What Terry did wrong:	Correct way to evaluate $-3x^2 - 4y^2$ for $x = 2$ and $y = -2$:
Evaluate $72 - 6 + 12 \div 3x$ for $x = -2$. Terry's answer: 75 What Terry did wrong:	Correct way to evaluate $72 - 6 + 12 \div 3x$ for $x = -2$:

Directions: Evaluate each expression for w = –4 and k = –6.

1. $w - w \bullet k$

2. kw^2

3. $5 - w(k + 8)$

lesson three - student resource sheet

Lesson Objective: Find exact or approximate square roots of numbers, and classify real numbers (rational, irrational, integers, whole, natural).

Vocabulary Box

real numbers – The combined set of rational numbers and irrational numbers. Examples: –22, 0, 100, $\sqrt{2}$, $\frac{3}{4}$.

natural numbers – The counting numbers. Examples: 1, 2, 3, and so on.

whole numbers – The set of numbers that includes 0 and all of the natural numbers. Examples: 0, 1, 2, 3, and so on.

integers – The set of numbers containing 0, the natural numbers, and all the negatives of the natural numbers. Examples: –3, –2, –1, 0, 1, 2, 3, and so on.

rational numbers – Numbers that can be expressed as the ratios of two integers. Examples: 5, –2, $\frac{3}{7}$, $4\frac{1}{2}$, 0.25, 15%.

irrational numbers – Numbers that cannot be expressed as the ratios of two integers. Examples: π, $\sqrt{5}$ (but not $\sqrt{9}$, which is 3 or -3).

square root – For *x,* the number that, when multiplied by itself, gives the number *x*. Examples: $\sqrt{100} = 10$, $\sqrt{100} = -10$, $\sqrt{8} \approx 2.83$.

Guided Practice

I. Complete the following practice problems with your partner. Then your teacher will review the answers. Make sure that you show all important work.

Directions: Approximate each square root to the nearest tenth.

1. $\sqrt{23}$

2. $\sqrt{10}$

II. Complete the following practice problems individually. Then your teacher will review the answers.

Directions: Give an example of each of the following sets of numbers.

1. natural numbers

2. whole numbers

3. integers

4. rational numbers

5. irrational numbers

6. real numbers

Summary/Closure

A. Vocabulary Words

1. Give an example of an irrational number.

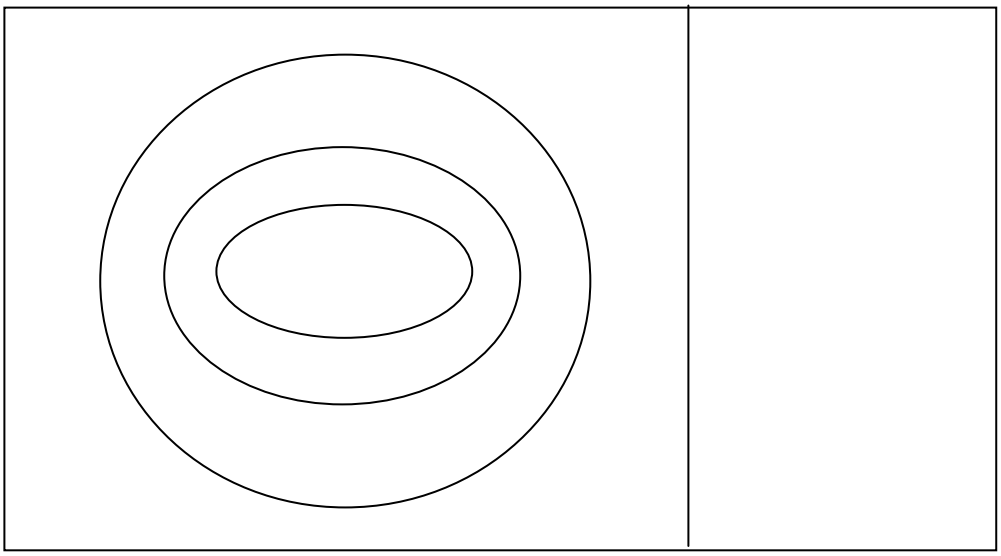
2. Give an example of a rational number that is not an integer.

3. Give an example of an integer that is not a whole number.

4. Give an example of a whole number that is not a natural number.

5. Give one number that is a natural number, a whole number, an integer, a rational number, and a real number.

Correctly place the following sets of numbers in the Venn diagram below: natural numbers, whole numbers, integers, rational numbers, irrational numbers.



All of the numbers in the Venn diagram are real numbers.

B. Summarize What We Learned Today

Directions: Write an example of each of the sets of numbers that we studied today. Next, show one example of how to approximate the square root of a *nonperfect* square to the nearest tenth. Then, write a few sentences explaining how to approximate the square root of a *nonperfect* square to the nearest tenth. You will use this explanation as a reference.