NAME:

1) Write verbal expressions of algebraic expressions
2) Write algebraic expressions for verbal expressions

**DEFINITIONS**

**Algebraic Expressions**

**Variables**

**Terms**

**Factors**

**Product**

**Power**

**Exponent & Base**

**MORE TERMS**

**PRACTICE**

Write verbal expressions for the following:

1. $2x$
2. $rac{2}{3}r^3$
3. The sum of a number and 12
4. 4 more than 10 times a number

Sister Mary Rebekah, O.P.
2016 Interactive Algebra 1 Notes
1) Use the order of operations to evaluate algebraic expression.
2) Use rules to evaluate expressions to use formulas.

**NOTE-IT**

P
Evaluate expressions inside of grouping symbols (aka __________).

E
Evaluate all the powers/______________

M
__________ from left to right

D
__________ from left to right

**FORMULAS**

1) Use the order of operations to evaluate algebraic expression.
2) Use rules to evaluate expressions to use formulas.

**Try-It**

**EVALUATE EXPRESSIONS**

**EVALUATE FORMULAS**

1. 

2. 

**Area of a Circle**

**Volume of a Sphere**
1) Identify the properties of equality and identity.
2) Recognize the commutative and associative properties.
3) Use these properties to evaluate expressions.

**Properties of Numbers**

**Properties of Equality**

- Reflexive Property
- Symmetric Property
- Transitive Property
- Substitution Property

**Properties of Identity**

- Additive Identity
- Additive Inverse
- Multiplicative Identity
- Multiplicative Inverse

**Properties of Equality**

- Reflexive Property
- Symmetric Property
- Transitive Property
- Substitution Property

**Properties of Identity**

- Additive Identity
- Additive Inverse
- Multiplicative Identity
- Multiplicative Inverse

**Definition**

Anything times zero = zero

\[ a \times 0 = 0 \]

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NAME:
1) Identify the properties of equality and identity.
2) Recognize the commutative and associative properties.
3) Use these properties to evaluate expressions.

Properties of Identity

Commutative Property

Associative Property

Practice
1) Define the distributive property.
2) Use the distributive property to simplify & evaluate expressions.

**Example #1**
3 \( (2+5) = 3 \cdot 2 + 3 \cdot 5 \)

**Example #2**
7 \( (3w - 5) = 7 \cdot 3w + 7 \cdot (-5) \)

**Try-It**
Use the Distributive Property to rewrite the following expressions, then evaluate:

1. \( 14 \ (51) \) 
2. \( (6 \ 1/9)9 \) 
3. \( (g-9)5 \) 
4. \( (4 + 5) \ 6 \) 
5. \( 14 \ (8 - 5) \) 

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2016 Interactive Algebra 1 Notes
NAME:

1) Solve equations given a replacement set.
2) Solve equations with one variable.
3) Solve equations with two variable.

1-5 Equations

Expression
3x + 7

Equation
3x + 7 = 13

Example #1
Find the solution set of the equation 2q + 5 = 13 if the replacement set is {2, 3, 4, 5, 6}.

<table>
<thead>
<tr>
<th>q</th>
<th>2q + 5 = 13 True or False</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>True</td>
</tr>
<tr>
<td>3</td>
<td>True</td>
</tr>
<tr>
<td>4</td>
<td>True</td>
</tr>
<tr>
<td>5</td>
<td>True</td>
</tr>
<tr>
<td>6</td>
<td>True</td>
</tr>
</tbody>
</table>

Example #2
7 - (4^2 - 10) + n = 10

Example #3
n(3 + 2) + 6 = 5n + (10 - 3)

Example #4
Solve: 3^2 - 2\cdot 3 + u = (3^3 - 3\cdot 8)(2) + u

Example #5
Solve: (4 - 2^2 + 5w) = 25

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2016 Interactive Algebra 1 Notes
Represent a Relation

Coordinate System

A point is represented on a graph using coordinate pairs.
- Ordered pair
- X-coordinate
- Y-coordinate

Relation

Domain Range

- Mapping
- Domain
- Range
1) Represent Relations.
2) Interpret graphs of relations.

### Faces of “Functions”

<table>
<thead>
<tr>
<th>Ordered Pairs</th>
<th>Table</th>
<th>Graph</th>
<th>Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>(x)</td>
<td>(y)</td>
<td><img src="image1.png" alt="Graph" /></td>
<td><img src="image2.png" alt="Mapping" /></td>
</tr>
</tbody>
</table>

**Independent Variable**

**Dependent Variable**

**Let’s analyze graphs of relations on pg. 401**
NAME:

1) Determine whether a relation is a function.
2) Find function values.

A function is a relation with one or more input values, where each has a single output value.

functions
Each input is only allowed to correspond to ONE output!

This relation is a function because none of the input values (x-values) has more than one different output (y-value).

<table>
<thead>
<tr>
<th>x</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
</tr>
</tbody>
</table>

This relation is NOT a function because at least one of the input values (x-values) has more than one different output (y-value).

<table>
<thead>
<tr>
<th>x</th>
<th>-3</th>
<th>2</th>
<th>-3</th>
<th>5</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>1</td>
<td>5</td>
<td>-1</td>
<td>2</td>
<td>-2</td>
</tr>
</tbody>
</table>

notation
When dealing with functions, you will see ______ in place of y.

How to say it out loud: ______

evaluating
To evaluate a function for a particular x-value, just ______ and then simplify!

Example: If \( f(x) = 2x + 1 \), find \( f(3) \).
Work: \( f(3) = 2(3) + 1 \)
Answer: ______
determining whether a relation is a function

Add circles, arrows, lines, etc. to demonstrate why each relation is/isn’t a function.

**table**

Review the columns. The relation will not be a function if any ___________ corresponds to more than one different ___________.

<table>
<thead>
<tr>
<th>A</th>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B</th>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>-6</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

**set-notation**

Review each ordered pair. The relation will not be a function if any ___________ corresponds to more than one different ___________.

<table>
<thead>
<tr>
<th>C</th>
<th>(3, 3), (4, -1), (2, 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>(1, 8), (0, -2), (1, -3)</td>
</tr>
</tbody>
</table>

**graph**

Use the ___________. The relation will not be a function if a vertical line ever ___________.

<table>
<thead>
<tr>
<th>E</th>
<th>graph 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>graph 2</td>
</tr>
</tbody>
</table>

**mappings-diagram**

Review the arrows. The relation will not be a function if any ___________ maps to more than one different ___________.

<table>
<thead>
<tr>
<th>G</th>
<th>mapping diagram 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>mapping diagram 2</td>
</tr>
</tbody>
</table>

**finding domain and range**

The domain is the set of all possible ___________. The range is the set of all possible ___________.

Identify the domain and range of the relations in the “table,” “set notation,” and “graph” examples above.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td></td>
</tr>
</tbody>
</table>

**TRY it**

Create a mapping diagram and a graph that each represent functions.
1) Identify the hypothesis and conclusion in a conditional statement.
2) Use a counter example to show that an assertion is false.

**Conditional Statements**

If a, then b.

**Deductive Reasoning**

The process of using rules, facts, definitions and properties to reach a valid conclusion.

**Counter Examples**

Counter examples are specific cases in which the hypothesis is true, but the conclusion is false.