
Essential Question: How do we determine if algebraic expressions are equivalent?

Do Now: Evaluate the algebraic expressions.

a) $(5p + 2) - p^2$ when $p = -3$

b) $-9bc^2$ when $b = 10$ and $c = -2$



Think about this...

Are $2x + y$ and $y + 2x$ equivalent? In what ways can we prove it?

1 st proof:	2 nd proof:
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Equivalent expressions...

- represent the same value for any value(s) substituted for the variables that they contain.
- look exactly the same when simplified.

Let's Review...



How do we simplify algebraic expressions?

1) **Like terms** of an expression are terms that contain the same variable(s) raised to the same power.

Ex: $2x$ and $3x$ are like terms Ex: $2x$ and $3y$ are not like terms

2) **Only** like terms can be combined.

Ex: $2x + 3y - 5x + y$

$2x - 5x + 3y + y$

$-3x + 4y$

$2x + 3y - 5x + y$ is equivalent to $-3x + 4y$

3) When simplifying expressions with parentheses (), first use the distributive property and then combine like terms.

Ex: $2(4x - 5y) + 7x$

$8x - 10y + 7x$

$8x + 7x - 10y$

$15x - 10y$

$2(4x - 5y) + 7x$ is equivalent to $15x - 10y$

Justifying Equivalence Using the Properties of Real Numbers

Is $6 + 3(5y)$ equivalent to $3(4y + 2) + 3y$? Simplify the expressions to find out.

Expression	Property/Process
$3(4y + 2) + 3y$	GIVEN EXPRESSION

Expression	Property/Process
$6 + 3(5y)$	GIVEN EXPRESSION
$6 + (3 \cdot 5)(y)$	
$6 + 15y$	
$15y + 6$	

Prove that $6 + 3(5y)$ is equivalent to $3(4y + 2) + 3y$ in another way.

1) Jack took the steps below to simplify an expression.

$$4x + 3x \rightarrow x(4 + 3) \rightarrow x(7) \rightarrow 7x$$

a) What properties did he use?

b) Prove that $4x + 3x$ is equivalent to $7x$ in another way.

2) Determine which of the following algebraic expressions are equivalent. Justify your response.

A. $3(n - 4)$

B. $3n - 4$

C. $3n - 12$

D. $4n - 12 - n$

E. $12 + n$

F. $3(n + 4)$

G. $-12 + 3n$

H. $2n + 4 + n$

Equivalent Expressions _____

Justification:



1) Algebraic expressions are equivalent when they represent the same _____.

2) We can prove algebraic expressions are equivalent by either creating identical expressions using _____ of real numbers or by substituting values for the variable(s) in each expression and _____ to see if the result is the same.