MathTeacherCoach.com

Math 6

UNIT 4 – Interactive Notebook

4-6 Equivalent Expressions

Name:		Date:	

Common Core Standards

CCSS.MATH.CONTENT.6.EE.A.2.C

Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas* $V = s^3$ *and* $A = 6\ s^2$ *to find the volume and surface area of a cube with sides of length* $s = 1/2$.

CCSS.MATH.CONTENT.6.EE.A.3

Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y*.

CCSS.MATH.CONTENT.6.EE.A.4

Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.*

Equivalent Expressions

Equivalent Expressions are expressions that have the same value. They may look different but will have the same result if calculated.

$$5^2 + 2 = 25 + 2 = 27$$

$$9 \times 3 = 27$$

$$5^2 + 2 = 9 \times 3$$

The same thing goes for expressions involving variables. In the expressions below, we can replace the variable x by number 3 and see if both expressions have the same result.

$$5x + 7 = (5)(3) + 7 = 15 + 7 = 22$$

$$2x + 3x + 9 - 2 = (2)(3) + (3(3) + 9 - 2 = 6 + 9 + 9 - 2 = 22$$

Generating Equivalent Expressions by Combining Like Terms

You can add up terms together to make a single term Study the examples and follow the steps as to how it is done.

Example:

Combine like terms in the expression $4x + 5 - x + 3$ to generate its equivalent expression.

Step 1: Identify all like terms. You may organize them in a way that all like terms are identified. Take note to use the + and – just before the coefficient. A highlighter can come in handy too, or you can group all like terms together before combining them.

$4x + 5 - x + 3$ or $4x - x + 5 + 3$

Step 2: Combine the coefficients of like terms and then copy the variable.

$$4x - x + 5 + 3$$

$$(4 - 1)x + 5 + 3$$

$$3x + 8$$

Therefore, $4x + 5 - x + 3$ and $3x + 8$ are **equivalent expressions**.

I Like You!

Identify the like terms by coloring the boxes with the same color.

$12m$	x^2y	gh	36
$21p$	$-q$	-5	$-9m$
$-3x^2y$	$-m$	$16q$	$-gh$
$6gh$	10	$32q$	$8x^2y$
$-x^2y$	$-25p$	$4m$	-24

Generating Equivalent Expressions by Factoring the GCF and Using the Distributive Property

By **factoring the GCF** and **using the distributive property**, we can generate equivalent expressions by rewriting them in **factored form** or **expanded form**.

Example: $12m + 8n$

Step 1: Expand each term of the expression using the prime factors of the coefficients.

$$3 \cdot 2 \cdot 2 \cdot m + 2 \cdot 2 \cdot 2 \cdot n$$

Step 2: Determine the factors that are common in each term. This will be the GCF.

$$3 \cdot \mathbf{2} \cdot \mathbf{2} \cdot m + \mathbf{2} \cdot \mathbf{2} \cdot 2 \cdot n$$

Step 3: The GCF is placed outside the parentheses and the rest will be placed inside the parentheses. Here, the distributive property is used.

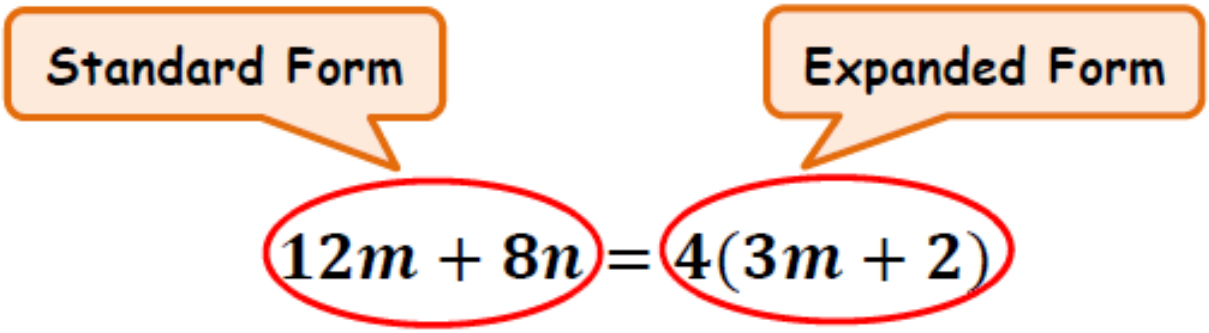
$$2 \cdot 2(3 \cdot m + 2 \cdot n)$$

$$4(3m + 2n)$$

Therefore, $12m + 8n = 4(3m + 2n)$.

Writing Equivalent Expressions from Expanded Form to Standard Form Using the Distributive Property

Using the distributive property we were able to find the expression equivalent to $12m + 8n$ in factored or expanded form.



Now, we will do it the other way around. We will rewrite expressions in expanded form to its equivalent expression in standard form.

Example: $5(3x + 2y)$

Step 1: Distribute the GCF by multiplying it to each term inside the parentheses.

$$(3x \cdot 5 + 2y \cdot 5)$$

Doing this removes the parentheses in the expression.

$$3x \cdot 5 + 2y \cdot 5$$

Step 2: To generate the standard form, find the product of each term.

$$15x + 10y$$

$15x + 10y$ is the standard form of $5(3x + 2y)$.

These two are equivalent expressions.

Complete the Quote

Use the distributive property to find the expression equivalent to the given expressions. Circle the correct answer then write the letter on top of the number at the bottom of the page to complete the quote.

1. $3(x+y)$	2. $9m-18n$	3. $4x(1+2z)$
N. $3x+3y$	S. $4m+5-18n$	W. $4xz+8xz$
O. $3+x+3+y$	T. $9(m-2n)$	X. $4z+8z$
P. $6xy$	U. $9m(1-2n)$	Y. $4x+8xz$

4. $5p(2+3q)$	5. $12gh-48h$	6. $24yz+36z$
F. $10q+15p$	P. $12(h-4)$	I. $12z(2y+3)$
G. $10p+15pq$	Q. $12(gh-4)$	J. $12y(2z+3)$
H. $10p+15q$	R. $12h(g-4)$	K. $12yz(2z+3)$

Mistakes are proof that you are…

2	5	3	6	1	4

Task Cards

Match the expressions that are equivalent.

1.	a.
$2(x+3y)$	$2x+6xy$

2.	b.
$x+2x+3y$	$2x+6y$

3.	c.
$2x(1+3y)$	$12(2x+y)$

4.	d.
$2x - 3y + y$	$3x + 2y$
5.	e.
$12x - 16y$	$3x + 3y$
6.	f.
$6x - 3x + 2y$	$2x - 2y$
7.	g.
$24x + 12y$	$4(3x - 4y)$

Answers:

I LIKE You!

12m	x^2y	gh	36
21p	-q	-5	-9m
$-3x^2y$	-m	16q	-gh
6gh	10	32q	$8x^2y$
$-x^2y$	-25p	4m	-24

Complete the Quote

1. $3(x+y)$	2. $9m-18n$	3. $4x(1+2z)$
(N) $3x+3y$	S. $4m+5-18n$	W. $4xz+8xz$
O. $3+x+3+y$	(T) $9(m-2n)$	X. $4z+8z$
P. $6xy$	U. $9m(1-2n)$	(Y) $4x+8xz$

4. $5p(2+3q)$	5. $12gh-48h$	6. $24yz+36z$
F. $10q+15p$	P. $12(h-4)$	(I) $12z(2y+3)$
(G) $10p+15pq$	Q. $12(gh-4)$	J. $12y(2z+3)$
H. $10p+15q$	(R) $12h(g-4)$	K. $12yz(2z+3)$

Mistakes are proof that you are...

T	R	Y	I	N	G
2	5	3	6	1	4

Task Cards

1. b
2. e
3. a
4. f
5. g
6. d
7. c