

Bell Ringer

Y

Are the two expressions $(2y+5y-5+8)$ and $7y+3$ equivalent? Explain your answer.

$$\underline{7y+3}$$

Are the two expressions $6(2a+b)$ and $12a+6b$ equivalent? Explain your answer.

$$6(2a) + 6(b)$$

$$12a + 6b$$

Y

$$5a) (22)(31)$$

$$(20+2)(30+1)$$

$$\begin{array}{r} 20(30) + 20(1) + 2(30) + 2(1) \\ 600 + 20 \qquad \qquad \qquad 60 + 2 \\ 620 \qquad \qquad \qquad + \qquad \qquad \qquad 62 \\ \hline \end{array}$$

$$\boxed{682}$$

$$6) (2x+2)(3x+1)$$

F.O.I.L.

$$6x^2 + 2x + 6x + 2$$

$$6x^2 + 8x + 2$$

$$\begin{aligned} 6) & (2x+2)(3x+1) \\ & 2x(3x+1) + 2(3x+1) \\ & 2x(3x) + 2x(1) + 2(3x) + 2(1) \\ & 6x^2 + 2x + 6x + 2 \\ & 6x^2 + 8x + 2 \end{aligned}$$

6)

\otimes	$2x$	2
$3x$	$6x^2$	$6x$
1	$2x$	2

$6x^2 + 8x + 2$

Equivalent Expressions

Fill in the blanks of this proof showing that $(w + 5)(w + 2)$ is equivalent $w^2 + 7w + 10$. Write "commutative property," "associative property," or "distributive property" in each blank.

$$(w + 5)(w + 2)$$

$$= (w + 5)w + (w + 5) \times 2$$

$$= w(w + 5) + (w + 5) \times 2$$

$$= w(w + 5) + 2(w + 5)$$

$$= w^2 + w \times 5 + 2(w + 5)$$

$$= w^2 + 5w + 2(w + 5)$$

$$= w^2 + 5w + 2w + 10$$

$$= w^2 + (5w + 2w) + 10$$

$$= w^2 + 7w + 10$$

DISTRIBUTIVE

COMMUTATIVE

COMMUTATIVE

DISTRIBUTIVE

COMM.

DIST.

ASSOCIATIVE

	$5(x-3)$	$5x-3$	$5x-15$
$x=7$	$5(7-3)$ $5 \cdot 4$ 20	32	20
$x=0$	$5(0-3)$ $5 \cdot -3$ -15	-3	-15
$x=1$	$5(1-3)$ $5 \cdot -2$ -10	2	-10

Exercise #2: Which property, the commutative, associative, or distributive, justifies the **equivalency** of the two expressions you determined to be equivalent above?

DISTRIBUTIVE

Which of the following expressions is equivalent to $5(2x+1)-4$?

(1) $10x-3$

~~(2) $7x-3$~~

~~(3) $10x+1$~~

~~(4) $7x+1$~~

~~A~~

$\frac{1}{2}$

$5(2x+1)$
 $10x+(5-4)$
 $10x+1$

Which of the following expressions is equivalent to $\frac{4(3x+1)-2}{2}-5$?

(1) ~~$4x-5$~~

(2) ~~$4x+1$~~

(3) $6x+3$

(4) $6x-4$

~~$\frac{1}{2}$~~

$\frac{1}{2}$

~~$12x+4-2$~~

$\frac{6}{2} \cdot \frac{12x}{2} + \frac{4}{2} - \frac{2}{2}$

~~$12x+2$~~

$6x+1-5$

$6x-4$

Which of the following expressions is equivalent to $10x+15$? (5)

(1) ~~$2(8x+13)$~~

(3) ~~$5(5x+3)$~~

* $5(2x+3)$ *

(4) ~~$10(x+3)$~~

$10x+15$

$5(2x+3)$

FACTORING EXPRESSIONS

Factoring is the process of writing an **equivalent expression** as purely the product of other expressions.

Factor each of the following expressions by writing an equivalent expression

(a) $6x+21$

(b) $-2x+10$

(c) $14x+14$

$$3(2x+7) \quad +2(x+5) \quad 14(x+1)$$

Which of the following expressions are equivalent? Why? ~~if an expression has no match, write 2 equivalent expressions to match it.~~

a. $2(x + 4)$

~~$2x + 8$~~
b. $8 + 2x$

~~c. $2x + 4$~~

d. $3(x + 4) - (4 + x)$

~~e. $x + 4$~~

~~$3x + (12 - 4) - x \Rightarrow 2x + 8$~~

Check whether the two expressions $2x+3y$ and $2y+3x$
equivalent.

$$2x+3y \quad \begin{matrix} (0,1) \\ (1,0) \\ (2,3) \end{matrix} \quad 2y+3x$$

$$2(0)+3(1)=3 \quad \times \quad 2(1)+3(0)=2$$

$$2(1)+3(0)=2 \quad \times \quad 2(0)+3(1)=3$$

$$2(2)+3(3)=13 \quad \times \quad 2(3)+3(2)=12$$

Check whether the two expressions $\frac{3 \times m \times m}{m}$ and $m + m + m$ equivalent.

The diagram shows the simplification of two expressions. On the left, the expression $\frac{3m^2}{m}$ is written, with a checkmark next to it. An arrow points from this expression to the simplified form $3m$. On the right, the expression $m + m + m$ is written, with a checkmark next to it. An arrow points from this expression to the simplified form $3m$. The two simplified forms, $3m$ and $3m$, are shown to be equivalent.

Since $3m$ equals $3m$, the two expressions are equivalent