

Lesson 12: Distributing Expressions

Classwork

Opening Exercise

- a. Create a model to show 2×5 .



- b. Create a model to show $2 \times b$, or $2b$.

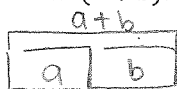


Example 1

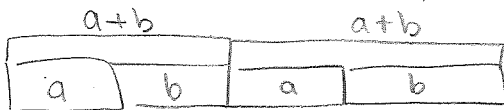
Write an expression that is equivalent to $2(a + b)$.

$$2a + 2b$$

Create a model to represent $(a + b)$.



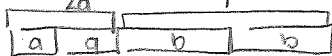
The expression $2(a + b)$ tells us that we have 2 of the $(a + b)$'s. Create a model that shows 2 groups of $(a + b)$.



How many a 's and how many b 's do you see in the diagram?

There are 2a's and 2b's.

How would the model look if we grouped together the a 's and then grouped together the b 's?



What expression could we write to represent the new diagram?

$$2a + 2b$$

What conclusion can we draw from the models about equivalent expressions?

$$2(a+b) = 2a + 2b$$

Let $a = 3$ and $b = 4$.

$$2(a+b)$$

$$2(3+4)$$

$$2(7)$$

$$14$$

$$2a + 2b$$

$$2(3) + 2(4)$$

$$6 + 8$$

$$14$$

What happens when we double $(a + b)$?

We double a and we double b .

Example 2

Write an expression that is equivalent to double $(3x + 4y)$.

How can we rewrite double $(3x + 4y)$?

Double is the same as multiplying by 2.

$$2(3x + 4y) \text{ or } 6x + 8y$$

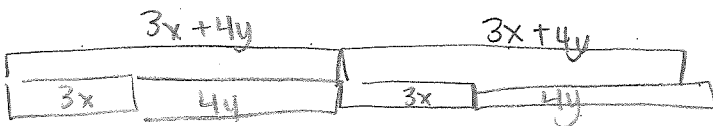
Is this expression in factored form, expanded form, or neither?

The first expression is in factored form, and the second expression is in expanded form.

Let's start this problem the same way that we started the first example. What should we do?



How can we change the model to show $2(3x + 4y)$?



Are there terms that we can combine in this example?

Yes, there are $6x$'s and $8y$'s.

What is an equivalent expression that we can use to represent $2(3x + 4y)$?

$$2(3x + 4y) = 6x + 8y$$

$$2(3x) + 2(4y)$$

Summarize how you would solve this question without the model.

When there is a number outside the $()$, I would multiply it by all the terms on the inside of the $()$.

Example 3

Write an expression in expanded form that is equivalent to the model below.

$$4x + 5$$



What factored expression is represented in the model?

$$y(4x + 5)$$

How can we rewrite this expression in expanded form?

$$y(4x) + y(5)$$

$$4xy + 5y$$

Example 4

Write an expression in expanded form that is equivalent to $3(7d + 4e)$.

$$3(7d) + 3(4e)$$

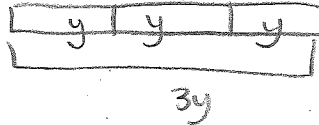
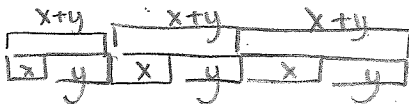
$$21d + 12e$$

Exercises

Create a model for each expression below. Then, write another equivalent expression using the distributive property.

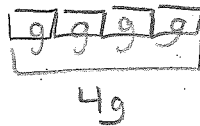
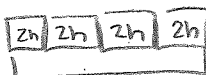
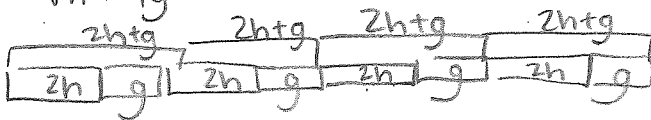
1. $3(x + y)$

$$3x + 3y$$



2. $4(2h + g)$

$$8h + 4g$$



Apply the distributive property to write equivalent expressions in expanded form.

3. $8(h + 3)$

$$8h + 24$$

4. $3(2h + 7)$

$$6h + 21$$

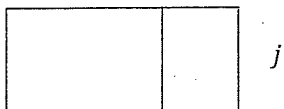
5. $5(3x + 9y)$

$$15x + 45y$$

6. $4(11h + 3g)$

$$44h + 12g$$

7. $7k$ $12m$



$$7kj + 12jm$$

8. $a(9b + 13)$

$$9ab + 13a$$