

Lesson 12: Distributing Expressions

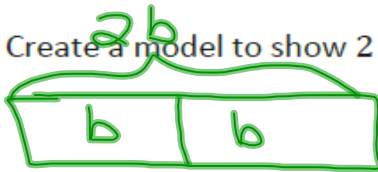
Classwork

Opening Exercise

- a. Create a model to show 2×5 .



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

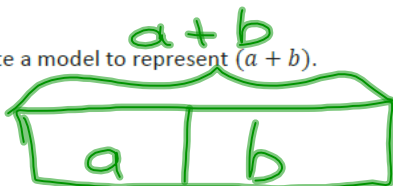


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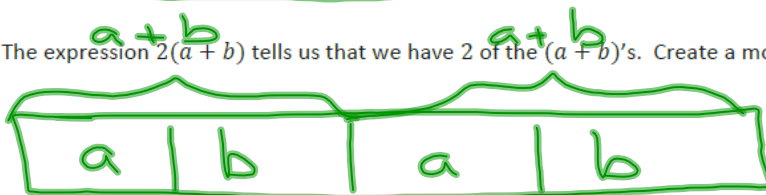
Example 1

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

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



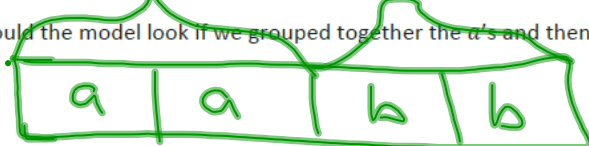
The expression $2(a + b)$ tells us that we have 2 of the $(a + b)$'s. Create a model that shows 2 groups of $(a + b)$.



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

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

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



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What expression could we write to represent the new diagram?

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

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

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

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Example 2

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



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

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

$$6x + 8y$$

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

Factored Form

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

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

Are there terms that we can combine in this example?

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

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

Summarize how you would solve this question without the model.

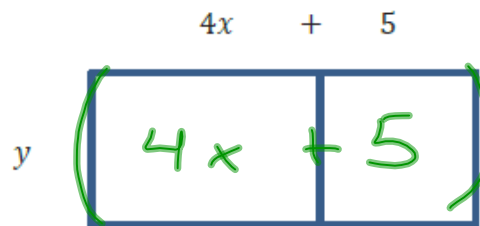
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Example 3

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

$$y(4x + 5)$$

$$4x + 5y$$
~~$$y + 4x + 5$$~~



What factored expression is represented in the model?

How can we rewrite this expression?

$$y \cdot 4x + y \cdot 5$$

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

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Example 4

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

Factored Form

$$3(7d + 4e) = 21d + 12e$$

Exercises

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

1. $3(x + y)$

2. $4(2h + g)$

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Apply the distributive property to write an equivalent expression.

3. $8(h + 3) = 8h + 24$

4. $3(2h + 7) = 6h + 21$

5. $5(3x + 9y) = 15x + 45y$

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

7.

$7k$	$12m$

$$j = j(7k + 12m) = 7jk + 12jm$$

8. $a(9b + 13)$

Handwritten calculations for problem 4:

$$3(2h + 7) = 6h + 21$$

$$3(2 \cdot 2 + 7) = 6 \cdot 2 + 21$$

$$3(4 + 7) = 12 + 21$$

$$3(11) = 33$$

Final result: 33

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Problem Set

1. Use the distributive property to expand the following expressions.

a. $4(x + y)$

b. $8(a + 3b)$

c. $3(2x + 11y)$

d. $9(7a + 6b)$

e. $c(3a + b)$

f. $y(2x + 11z)$

2. Create a model to show that $2(2x + 3y) = 4x + 6y$.

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Exit Ticket

Use the distributive property to expand the following expressions.

1. $2(b + c)$

2. $5(7h + 3m)$

3. $e(f + g)$

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