Open the TI-Nspire document *The_Distributive_Property.tns*.

In elementary school, you might have used the distributive property when doing arithmetic to help you simplify computations. For example, to compute 3×125, you might have thought of 125 as 100 + 25 and then computed the product using the following method:

$$3(125) = 3(100 + 25) = 3(100) + 3(25) = 300 + 75 = 375$$

You might have shown your work in this expanded form. This is an example of the *distributive property*. The distributive property is very powerful and can also be used in algebra. In this activity, you will explore how this property can be used as a tool to develop equivalent algebraic expressions (expressions that always result in the same number).
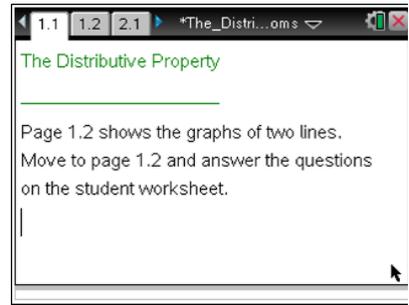
Move to page 1.2.

Press ⟨ctrl⟩ ▶ and ⟨ctrl⟩ ◀ to navigate through the lesson.

To change the slider, move the cursor to the slider, and press 🖱. You will see the hand 👆. Then press ▲ or ▼ as needed (◀ or ▶ as needed).

1. On Page 1.2, Lines A and B are shown. Your goal is to make the lines coincide (or lie exactly on top of each other). You can change the values of *a* and *b* by clicking on the sliders. As you do, you will change Line B (the green line). When you have manipulated a and b to place Line B is on top of Line A (the red line), write the expression for Line B below.

$$\text{Line A} = 2(x - 1) = \text{Line B} = \text{_____}$$

Now that the two lines coincide, are the expressions for Line A and Line B equivalent? Explain.

2. There is a third slider labeled "new" on Page 1.2. Click on this slider, and you will change the expression for Line A. Again, your goal is to make the two graphs coincide by changing the values of *a* and *b,* which in turn changes Line B. Record your results in the first line of the table below. Click on the slider for "new" several more times, and record your results in the next rows of the table.

Line A		Line B	
Line A		Line B	
Line A		Line B	
Line A		Line B	

3. Consider the findings you have made so far, and create a general rule for generating equivalent expressions for $a(x + c)$.

Move to page 2.2.

4. On Page 2.2, you are given Lines C and D. Again, your goal is to make the two graphs coincide, but now you will change the values of *a* and *c* to change Line D. Try several examples. Record your results in the first line of the table below.

Line C		Line D	
Line C		Line D	
Line C		Line D	
Line C		Line D	

5. Consider the findings you have made so far, and create a general rule for generating equivalent expressions for $ax + ac$.

6. Richie believes that the expression $3(x - 4)$ is equivalent to the expression $3x - 4$. Is he correct? Why or why not?

7. Alice believes that the expression $^-2x - 4$ is equivalent to the expression $^-2(x + 2)$. Is she correct? Why or why not?

8. In your own words, state how you can use the Distributive Property to form equivalent algebraic expressions.