Algebra 1  
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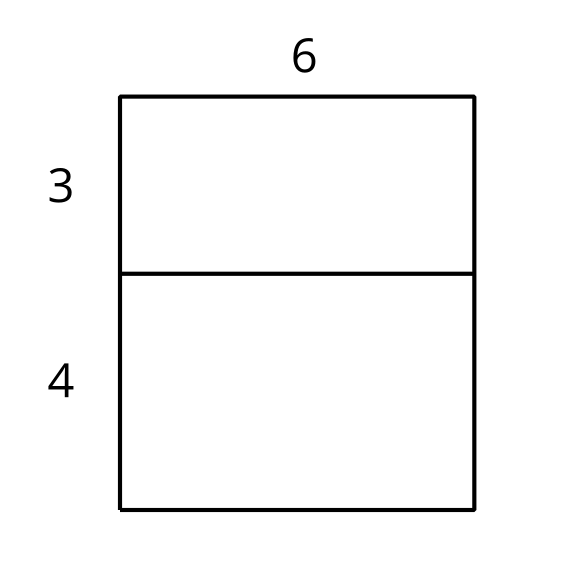
Unit 7, Lesson 8

# Equivalent Quadratic Expressions

* Let’s use diagrams to help us rewrite quadratic expressions.

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## 8.1Diagrams of Products

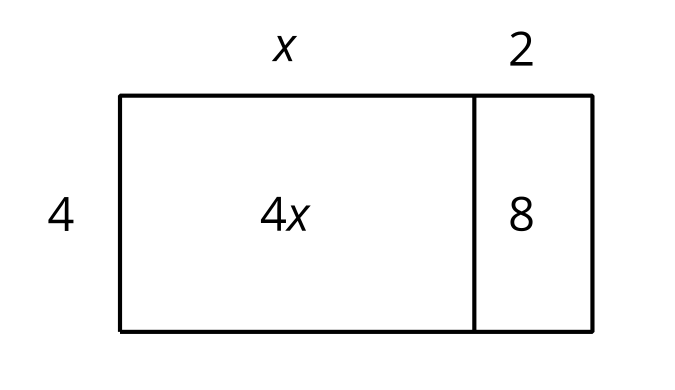


1. Explain why the diagram shows that .
2. Draw a diagram to show that .

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## 8.2Drawing Diagrams to Represent More Products

Applying the distributive property to multiply out the factors of, or expand, gives us , so we know the two expressions are equivalent. We can use a rectangle with side lengths of  and 4 to illustrate the multiplication.



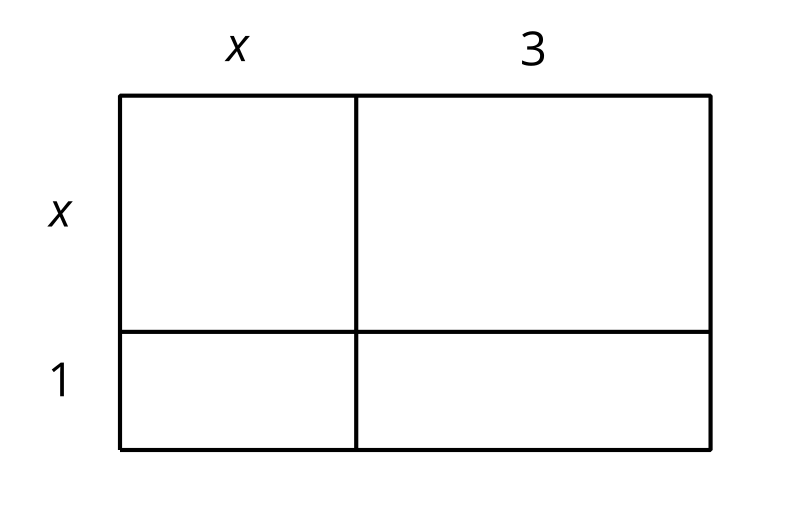
1. Draw a diagram to show that and are equivalent expressions.
2. For each expression, use the distributive property to write an equivalent expression. If you get stuck, consider drawing a diagram.

* a.
* b.
* c.
* d.

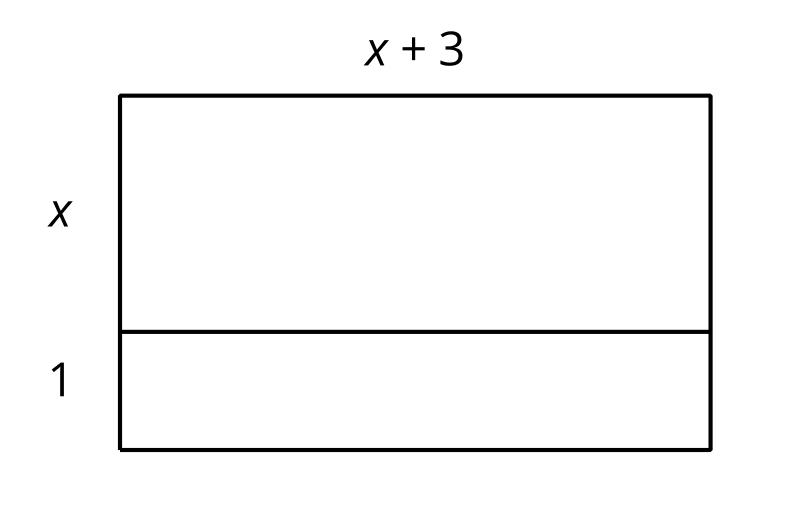
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## 8.3Using Diagrams to Find Equivalent Quadratic Expressions

1. Here is a diagram of a rectangle with side lengths of  and . Use this diagram to show that and are equivalent expressions.

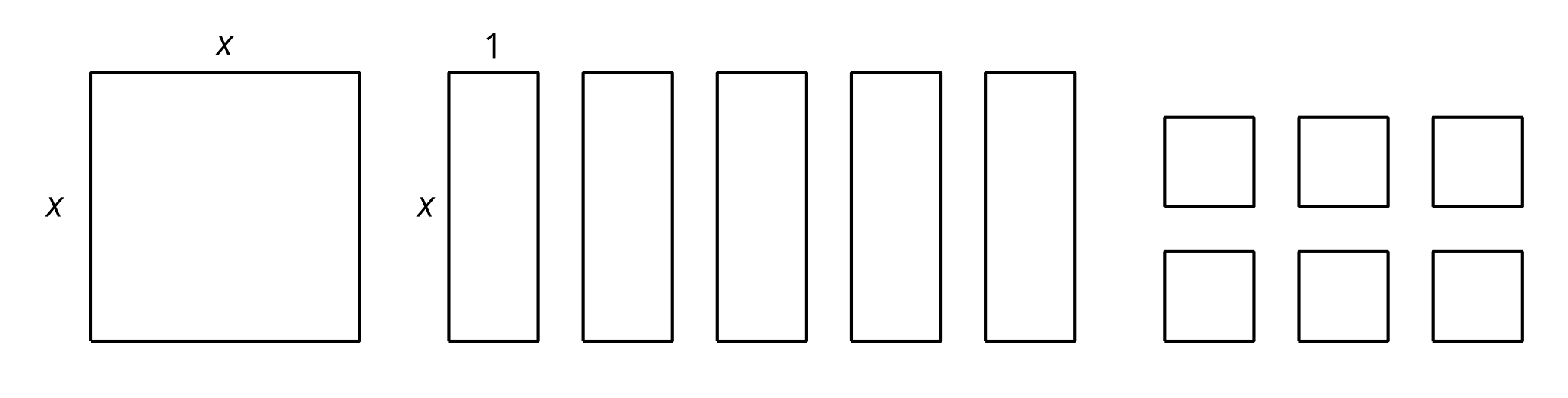
* 

1. Draw diagrams to help you write an equivalent expression for each of the following:
2. Here is a diagram of a rectangle with the same area as in the first question. Use this diagram to show that and are equivalent expressions. Then explain how you could rewrite that expression as , without a diagram.

* 

1. Write an equivalent expression for each expression:

### Are you ready for more?

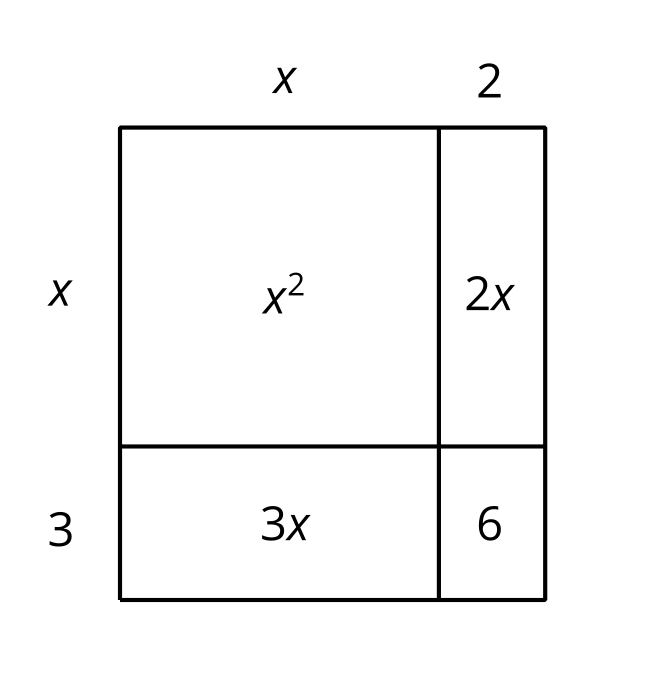


1. Is it possible to arrange an -by- square, five -by-1 rectangles and six 1-by-1 squares into a single large rectangle?  Explain or show your reasoning.
2. What does this tell you about an equivalent expression for ?
3. Keeping the -by- square and the five -by-1 rectangles, can you form a different rectangle by using a different number of 1-by-1 squares than what is shown?

## Lesson 8 Summary

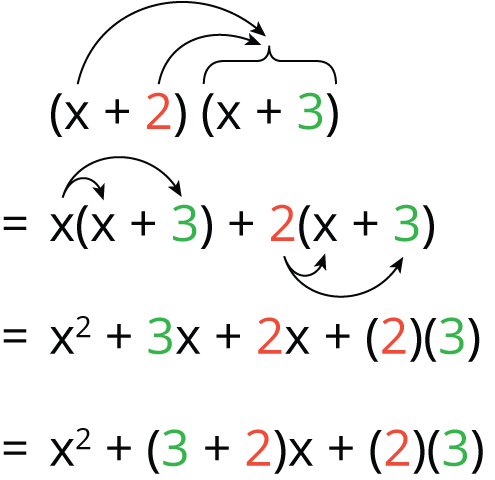
A quadratic function can often be defined by many different but equivalent expressions. For example, we saw earlier that the predicted revenue, in thousands of dollars, from selling a downloadable movie at dollars can be expressed with , which can also be written as .

Sometimes a quadratic expression is a product of two factors that are each a linear expression, for example . We can write an equivalent expression by thinking about each factor, the and , as the side lengths of a rectangle, with each side length being decomposed into a variable expression and a number.



Multiplying and gives the area of the rectangle. Adding the areas of the four sub-rectangles also gives the area of the rectangle. This means that is equivalent to , or to .

Notice that the diagram illustrates the distributive property being applied. Each term of one factor (say, the and the 2 in ) is multiplied by every term in the other factor (the and the 3 in ).



In general, when a quadratic expression is written in the form of , we can apply the distributive property to rewrite it as , or as .