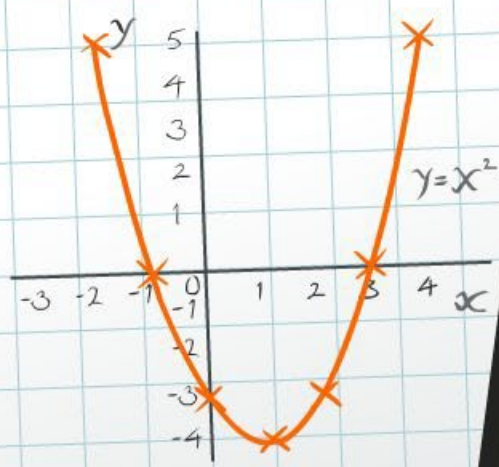
Working with parentheses

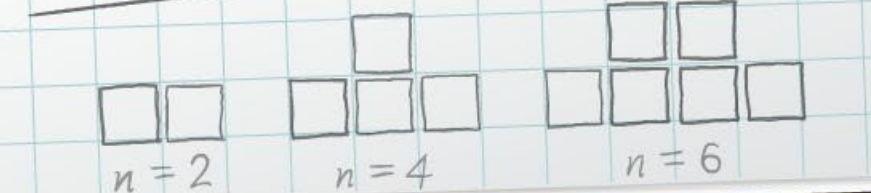
x	-2	-1	0	1	2	3	4
y	5	0	-3	-4	-3	0	5

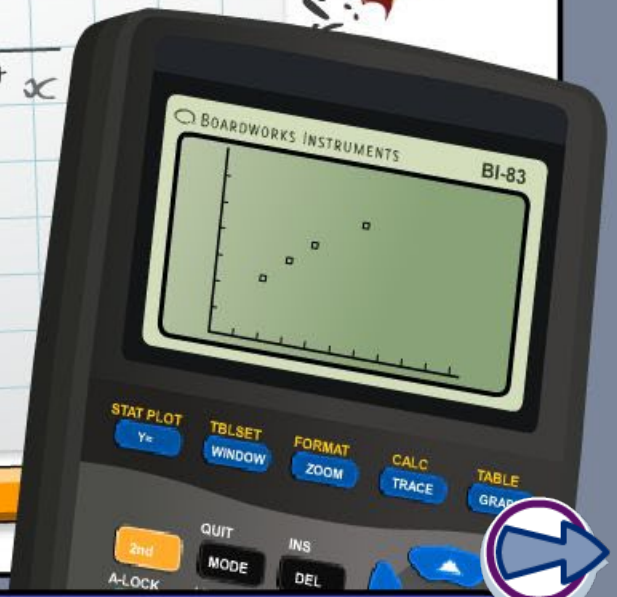
$x^2 - 2x - 3 = 0$

$(x+1)(x-3) = 0$

$x = -1$ or $x = 3$







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Information

Common core icons

This icon indicates a slide where the Standards for Mathematical Practice are being developed. Details of these are given in the Notes field.

Slides containing examples of mathematical modeling are marked with this stamp.

This icon indicates an opportunity for discussion or group work.

The **Standards for Mathematical Practice** outlined in the Common Core State Standards for Mathematics describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

They are:

1) Make sense of problems and persevere in solving them.

2) Reason abstractly and quantitatively.

3) Construct viable arguments and critique the reasoning of others.

4) Model with mathematics.

5) Use appropriate tools strategically.

6) Attend to precision.

7) Look for and make use of structure.

8) Look for and express regularity in repeated reasoning.

This icon indicates that the slide contains activities created in Flash. These activities are not editable.

This icon indicates teacher's notes in the Notes field.

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Multiplying with parentheses

How can we rewrite the expression $3y(4 - 2y)$ without the parentheses?

This means $3y \times (4 - 2y)$.

We need to multiply every term inside the parentheses by the term outside the parentheses.

$$3y(4 - 2y) = 3y(4) - 3y(2y)$$
$$= \mathbf{12y - 6y^2}$$

This rule for multiplying terms over parentheses is called applying the **distributive property** or **expanding**.

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Multiplying with parentheses

How can we rewrite the expression $-a(2a^2 - 2a + 3)$ without the parentheses?

Watch out for cases where there is a negative term outside the parentheses. Be careful to take the signs into account.

$$-a(2a^2 - 3a + 1) = \mathbf{-2a^3 + 3a^2 - a}$$

Simplify the following using the distributive property:

1) $-x(y + z) = \mathbf{-xy - xz}$

2) $-x(y - z) = \mathbf{-xy + xz}$

3) $-(y + z) = \mathbf{-y - z}$

4) $-(y - z) = \mathbf{-y + z}$

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Multiplying parentheses and simplifying

Sometimes we apply the distributive property to multiply out parentheses, then we need to simplify what's left. We do this by **combining like terms**.

For example, expand and simplify $3x + 2x(5 - x)$.

We need to multiply the parentheses by $2x$ and then combine like terms.

$$3x + 2x(5 - x) = 3x + 10x - 2x^2$$

$$= \mathbf{13x - 2x^2}$$

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Applying the distributive property and simplifying

Question: 1/4

Apply the distributive property and simplify:

$4 - (5n - 3)$

$1 - 5n$	$20n - 12$
$7 - 5n$	$-20n + 12$

Press the "=" button to show the work step by step.

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Find the area of the rectangle

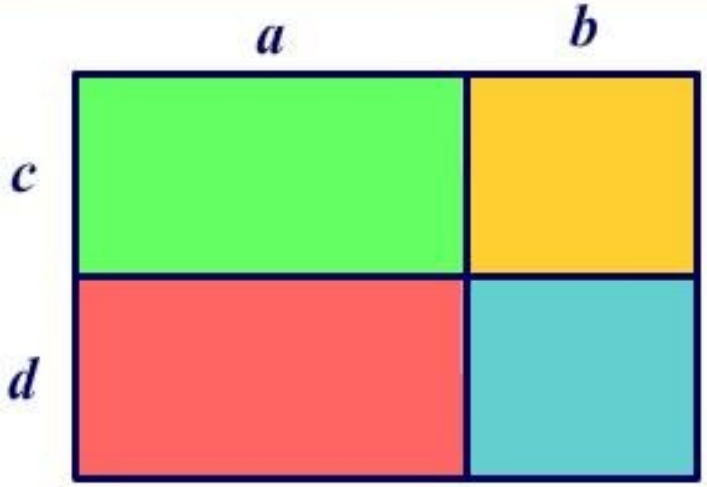
Find the area of a rectangle of length $(a + b)$ and width $(c + d)$. How does this demonstrate the distributive property?

Hint

Step 1

Step 2

Step 3



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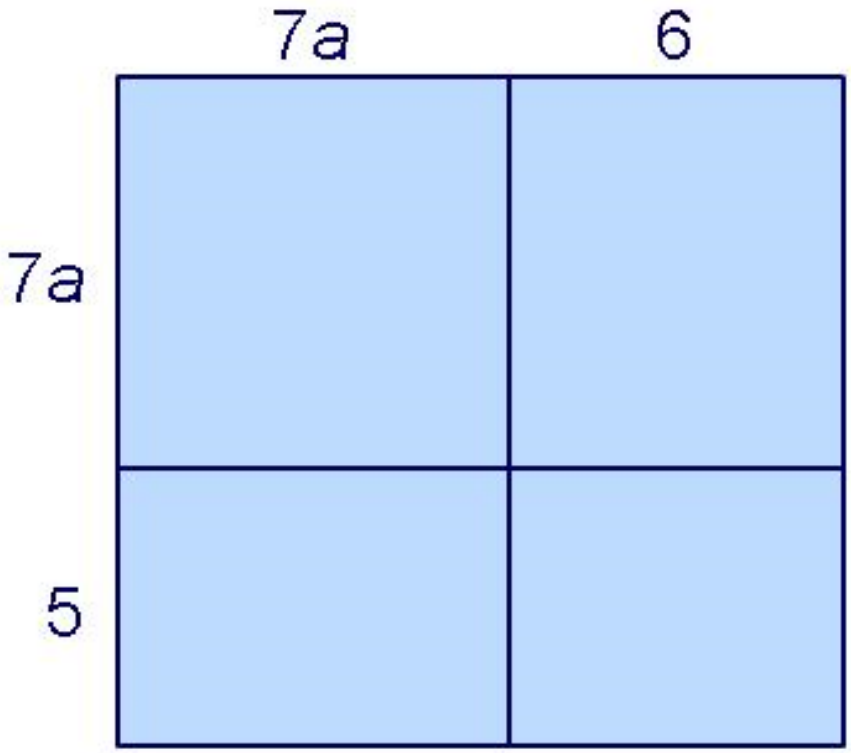
Find the area of the rectangle

Find the area of a rectangle of length $7a + 6$ and width $7a + 5$.

$(7a + 6)(7a + 5) =$



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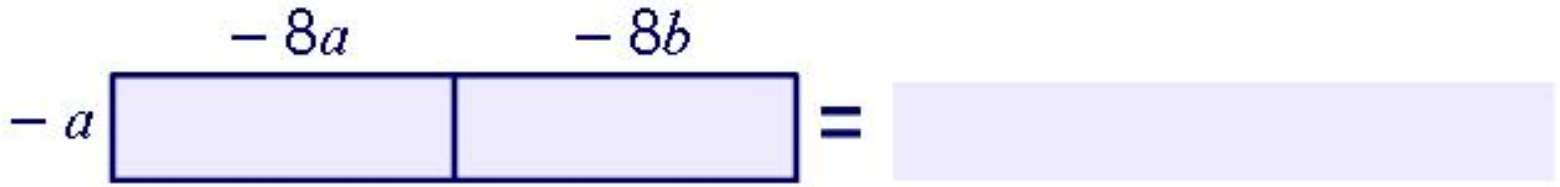
Practice questions

Expand the given expression. Use the grid method to help you if necessary. Press colored areas to see the steps.

$$-a(-8a-8b)$$



1 2 3

Difficulty

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Card tricks 1

From a normal pack of playing cards, choose 2 cards: one spade and one heart, both with a value between 1 (Ace) and 9. Do not show your teacher. Add 6 to the value of the spade. Multiply this number by 10. Add the value of the heart to your number. What is your answer? Your teacher can tell you! **How do they do it?**

Click the buttons for help:

- Analyze
- Plan
- Solve
- Check

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Card tricks 2

From a normal pack of playing cards, choose 2 cards: one spade and one heart, both with a value between 1 (Ace) and 9. Do not show your teacher. Multiply the spade by 5. Add 2 to this number. Multiply by 2. Add the value of the heart to your number. What is your answer? Your teacher can tell you! **How do they do it?**

Click the buttons for help:

Analyze

Plan

Solve

Check

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