

Algebra Tiles Tool Help File v1.2

The algebra tiles tool contains four tabs: Add/Subtract, Multiply, Factor, and Solve.

Add/Subtract Tab

On the Add/Subtract tab, you can add or subtract algebra tiles representing two expressions.

To begin modeling a sum or difference, you can click or drag any of the active algebra tiles at the left to make them appear in the top expression box. As you add tiles to the expression box, the value of the expression represented by the tiles you have placed in the box to that point is displayed above the box.

You can add two x^2 -tiles or two $-x^2$ -tiles, four x -tiles or four $-x$ -tiles, and four 1-tiles or four -1 -tiles to each expression box. For each set of opposite tiles, you can add only one of the types to each expression box. Once you add one tile of one type to the expression box, its opposite is immediately disabled. It is assumed that the expression you wish to model is in simplest form before you model it. To remove a tile from the expression box, click on it or drag it outside the expression box.

Once you have modeled your first expression, click the OK button to the right of the expression box to begin modeling your second expression. Model your second expression and then click the OK button.

Once you click the second OK button, the two expressions are modeled at the right. Now, you need to click on either the (+) or (-) sign to determine whether you want to model the sum or difference of the two expressions.

When you click the (+) symbol to add, the two expressions are combined at the top of the bin at the right. If there is nothing to simplify after combining the expressions, the equation of the sum of the two expressions is shown at the top of the bin. If the sum of the two expressions is not simplified, the bin value will show the combined value of each tile type. To simplify the expression in this case, use your mouse cursor to drag a rectangular box around the tiles that make zero pairs. If you boxed full sets of zero pairs only, the remove icon at the lower right of the bin will become active, and by clicking the remove button, those zero pairs will be removed from the bin. Once you have removed all zero pairs, the sum equation of the expressions will appear at the top of the bin.

When you click the (-) symbol to subtract, expression in the lower part of the bin shows an animation of the tiles turning to their opposites, then being added to the top of the bin. If there is nothing to simplify, the equation of the difference of the two expressions is shown at the top of the bin. If the difference is not simplified, you will need to remove the zero pairs of each tile type to show the final difference equation.

At any time you can click the Reset All button at the bottom of the screen to start over. Note that by clicking the Reset All button, you will lose all current work the tab.

Multiply Tab

To begin modeling a product of two expressions, you can click or drag any of the active algebra tiles at the left to make them appear in the top expression box. As you add tiles to the expression box, the value of the expression represented by the tiles you have placed in the box to that point is displayed above the box.

You can add four x -tiles or four $-x$ -tiles, and four 1-tiles or four -1 -tiles to each expression box. For each set of opposite tiles, you can only add one of the types to each expression box. Once you add one tile of one type to the expression box, its opposite is disabled. It is assumed that your expression is simplified before you model it. To remove a tile from the expression box, click on it. Once you have modeled your first expression, click the OK button to the right of the expression box to begin modeling your second expression. Model your second expression and then click the OK button.

Once you click the second OK button, the Continue button appears in the center of the screen. By clicking Continue, a dialog box will appear instructing you to model the product of the two expressions in the bin at the right using tiles from the tile bank at the far left. Now, you click Continue in the dialog box to model the product.

You should now see the two expressions modeled along the left and top of the right-hand bin respectively, as well as the value of each expression. With the help of the grid lines in the right-hand bin, you can now align tiles from the tile bank to fill out the area containing the product of the two expressions in the bin. Note that now all the tiles are active in the tile bank at the left, including the $-x^2$ and x^2 tiles. You can only fill a space outlined by the grid lines with a tile of the appropriate size and only with the tile of correct value. Once at least one tile is placed in the product area of the bin, the OK button at the lower right of the right-hand bin is active. When you are done modeling in the product area of the bin, press the OK button to check if the product you modeled is correct for expressions you originally entered.

If your model is correct, you will see a dialog box that states that the product you modeled is correct for the two expressions you entered. Click the OK button in the dialog box, and then you will see the simplified expression of the product that you have just modeled. If your model is incomplete and you click the OK button, you will see a dialog box that will give a hint about how to find the correct answer. Click the Retry button to try again until you successfully model the product.

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Factor Tab

On the Factor tab, you can model a quadratic expression that can be factored.

To model the expression to be factored, you can click or drag any of the active algebra tiles at the left to make them appear in the top expression box. As you add tiles to the expression box, the value of the expression represented by the tiles you have placed in the box to that point is displayed above the box.

You can add five x^2 -tiles, ten x -tiles, or ten $-x$ -tiles, and ten 1-tiles or ten -1 -tiles to each expression box. To remove a tile from the expression box, click on it, or drag it outside the

expression box.

If you have modeled an expression that can be factored, you will see a dialog box instructing you to use those tiles to build a rectangle or square in the right-hand bin. If the expression cannot be factored, you need to enter an expression that can be factored in order to continue.

Begin by dragging one of the tiles into the right-hand bin and dropping it. The tile you drop will now move to the center of the right hand bin. As it appears in the right-hand bin, the tile can now be viewed as a product of two factors, as height and width, exactly the opposite of the how the Multiply tab. You can now add other tiles to any open side of the tile(s) already in the right-hand bin. As you build your square or rectangle in the right-hand bin, you should attach more tiles from the left-hand bin to tiles that are in the right hand bin. You can only attach tiles from the left-hand bin that are of the same height or width as the open side of the tile in the right-hand bin you are attaching to. As you add more tiles, the two expressions modeled along the left and top of the right-hand bin will update. You can add zero pairs of tiles to the left-hand bin, if necessary, to help model the polynomial.

Once you have modeled the polynomial correctly, you will see a dialog box that states that the polynomial you modeled has been factored correctly. Click the Continue button in the dialog box, and then you will see the equation containing the factored expression of the polynomial that you have just modeled.

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Solve Tab

On the Solve tab, you can use algebra tiles to solve a one-step equation using addition or subtraction.

To solve a one-step equation, you first need to model an expression in the left-hand bin. You can click or drag any of the active algebra tiles at the left to make them appear in the top expression box. An x -tile is already placed in the left-hand bin as the variable to solve for.

You can add ten 1-tiles or ten -1 -tiles to the left-hand bin. Once you add a tile of one type to the bin, its opposite is immediately disabled. It is assumed that the expression you wish to model is in simplest form before you model it. As you add tiles to the left-hand bin, the value of the expression represented by the tiles you have placed in the bin to that point is displayed above the left-hand bin. To remove a tile from the left-hand bin, click on it or drag it outside the bin. The x -tile is not removable in this tab.

Once you have modeled the expression in the left-hand bin, click on the OK button at the bottom of the bin.

Now you can model the expression representing the other half of the equation in the right-hand bin. The rules for adding tiles to the right-hand bin are the same as those of the left-hand bin. There should be no x -tile in the right-hand bin. As you add tiles to the right-hand bin, the value of the expression represented by the tiles you have placed in the bin to that point is displayed above the right-hand bin. To remove a tile from the right-hand bin, click on it or drag

it outside the bin. Once you have modeled the expression in the right-hand bin, click on the OK button at the bottom of the bin.

Now that the equation to solve has been modeled, you can begin simplifying the equation to solve for "x". If a 1-tile or -1-tile exists on both sides of the equation, you can drag one of the tiles outside of its bin to remove them. You should notice that a tile of the same type is dragged outside its bin from the opposite bin to keep the equation balanced. You can also select multiple tiles in either bin by using the cursor and holding down the mouse button as you draw a rectangle around the tiles you wish to select. As you dragged the select(ed) tiles outside of a bin, if there are at least the same number of the same tile type as selected in the other bin, those tiles will be removed from both bins. If you selected one or more tiles from any bin, and there aren't enough in the opposite bin to remove, when you move the selected tiles outside their bin, the tiles will snap back inside the bin so that you can try again.

To help solve an equation when there are tiles of different types on each side of the equation, you can use either the zero pairs or the individual tiles located in between the left-hand and right-hand bins. To add a zero pair to either side, just click and drag on the zero pair image that appears between the bins. You can add zero pairs to either bin until there are ten 1-tiles or ten -1-tiles in that bin. You can remove zero pairs from either bin at any time by selecting one or more zero pairs in a bin and dragging them outside that bin. You can also add a 1-tile or -1-tile to the bins at any time by clicking on the 1-tile or -1-tile in between the bins. When you add one of these tiles, one of the same type is added to the opposite bin, to ensure that the equation remains balanced. You can add 1- or -1 tiles to either bin until there are ten 1-tiles or ten -1-tiles in either bin.

Once you have simplified the equation so that only the x-tile remains on the left and only one type of tiles remains on the right, the equation has been solved. You can see the final expression by counting the remaining tiles in each bin, or by viewing the expression above each bin. An equal sign is positioned at the top of the screen between the two bins so that you may easily read the final equation from left to right.

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