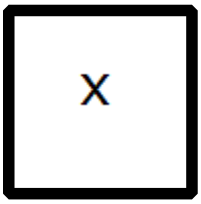
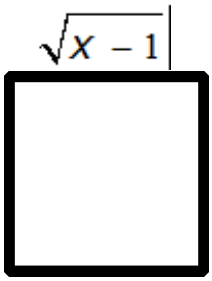
Can the Area Model Help Me Solve Radical Equations?

Recall that if a square has an area of 4, then its side equals $\sqrt{4}$ or 2. Similarly, if a square has an area of 3, then its side has a length of $\sqrt{3}$. Label the side of this square if the area of the square is x.



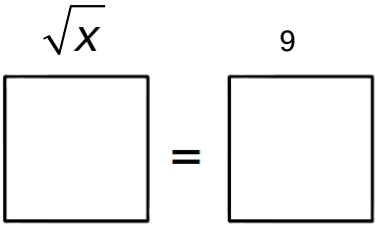
Label the area of this square if the length of the side is $\sqrt{x-1}$



The Radical Equation Template contains two sets of equations that show either two squares are equal or two sets of squares add up to two other squares.

What does that mean when the expressions are equal?

Use the Radical Equation Template to represent the following equation: $\sqrt{x} = 9$.



What is the area of each square? The area of the two squares are x and 81. What does that tell you about x? Since the areas are equal, x=81. We can check our answer by replacing x with 81 in the original equation: $\sqrt{81} = 9$

Use the Radical Equation Template to visualize what each equation is describing. Then use the model to help you solve for the value of x. Check your answer when you are done.

1. $\sqrt{x-1} = 7$
2. $\sqrt{x} - 10 = 0$
3. $\sqrt{6x} - 13 = 23$
4. $\sqrt{4x} = 20$
5. $\sqrt{x} + \frac{1}{3} = \frac{13}{3}$
6. $\sqrt{x} + 2 = \sqrt{2x} - 9$
7. $\sqrt{4x+1} + 5 = 10$
8. $\sqrt{x+2} = x$
9. $\sqrt{x-6} = \frac{1}{5}x$
10. $x = \sqrt{4x+5}$

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