# Solving Linear Equations Using a TI-86

Before you begin, clear all previously saved functions and set the viewing window.


**To Clear Previously Saved Functions**
> **Graph**
> **F1: Y=**
> **F4: DelF**

**To Set Graph Scale**
**Graph**
**F3:  Zoom**
**F4:  ZStd**
**F3:  Zoom**
**More**
**F2:  ZSqr**


## Solve:    $4(x - 3) - x = x - 6$


## Algebraically:

$$4(x - 3) - x = x - 6$$
$$4x - 12 - x = x - 6$$
$$3x - 12 = x - 6$$
$$2x = 6$$
$$x = 3$$


**There are two ways to solve a linear equation graphically:  Using Root and Using Intersection**


## Graphically:  Using Zero (Root)

Rewrite the equation with 0 on one side.
$$4(x - 3) - x - x + 6 = 0$$

Let Y1 equal the left side of the equation.
> **Graph**
> **F1: Y=**
> $Y1 = 4(x - 3) - x - x + 6$

Then graph.
> **Graph**
> **F5: Graph**

> **More**
> **F1: Math**
> **F1: Root**
> **Left Bound?:** - move cursor to the left of the x intercept using the left or right arrows
> **Enter**
> **Right Bound?:** - move cursor to the right of the x intercept using the right arrow
> **Enter**
> **Guess?** - move cursor close to the x-intercept
> **Enter**

At the bottom of the screen, it shows the x and y coordinate of the x intercept.  (3, 0)

**x=3 is the solution to the equation.**

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## Graphically:  Using Intersection

Each side of the equation represents a linear expression.  If both sides of the equation are graphed, their point of intersection has the same y value.  Therefore, the x-coordinate of the point of intersection represents the solution to the equation.

Graph both linear expressions:

> **Graph**
> **F1: Y=**
> (Clear functions)
> $Y1 = 4(x - 3) - x$
> $Y2 = x - 6$
> **Graph**
> **F5: Graph**

To find the point of intersection:

> **More**
> **F1: Math**
> **More**
> **F3: Isect**
> **1st Curve:**  (The cursor should be blinking on one line and the equation number will appear in the upper right hand corner of the window.  If you can't see the cursor, use the left or right arrows to bring it into view.)
> **Enter**
> **2nd Curve:**  (The cursor should move to the next line and the number will change to 2)
> **Enter**
> **Guess?:** - move cursor to the point of the intersection using the right or left arrow keys
> **Enter**

At the bottom of the screen, it shows the x and y coordinate of the point of intersection.  (3, -3)

**x=3 is the solution to the equation.**