

Using the Graphing Calculator to Solve Equations (Intersection Technique)

Solve the equation: $x^2 + 2x - 3 = 4x + 5$

Method 1 Using the Intersection of 2 Graphs

Press $\boxed{Y=}$ on your graphing calculator to **enter your functions**

Let $Y1 = x^2 + 2x - 3$, the left side of the equation

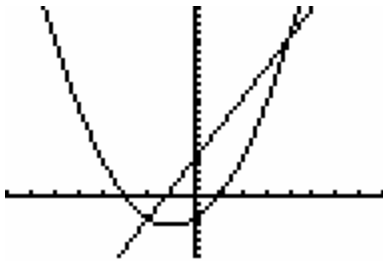
Let $Y2 = 4x + 5$, the right side of the equation

Press \boxed{WINDOW} on your graphing calculator to set the **graphing window**

Let $Xmin = -8$, $Xmax = 8$, $Xscl = 1$, $Ymin = -8$, $Ymax = 25$, $Yscl = 1$, $Xres = 1$

Press \boxed{GRAPH} on your graphing calculator to **graph the 2 functions**

Your graph should look similar to the graph below



Now find the point(s) of intersection

Press $\boxed{2^{nd}} \boxed{CALC}$ **Intersect** and find the 1st point of intersection of the 2 graphs

$x = -2$ $y = -3 \Rightarrow (-2, -3)$ is a point of intersection of the 2 graphs
 $\Rightarrow x = -2$ is a root of the equation

Press $\boxed{2^{nd}} \boxed{CALC}$ **Intersect** again and find the 2nd point of intersection of the 2 graphs

$x = 4$ $y = 21 \Rightarrow (4, 21)$ is a point of intersection of the 2 graphs
 $\Rightarrow x = 4$ is a root of the equation

Conclusion: The solution to the equation $x^2 + 2x - 3 = 4x + 5$ is $x = -2$ or $x = 4$

Using the Graphing Calculator to Solve Equations (Intersection / x-intercept Technique)

Solve the equation: $x^2 + 2x - 3 = 4x + 5$

Method 2 Using the x-intercept(s) of a Graph

First, you must set one side of the equation equal to zero

$$\begin{array}{rcl} x^2 + 2x - 3 = 4x + 5 & \text{Subtract } 4x \text{ from both sides of the equation and} \\ \underline{-4x - 5} & \underline{-4x - 5} & \text{Subtract 5 from both sides of the equation.} \\ x^2 - 2x - 8 = 0 & & \text{is the resulting equivalent equation.} \end{array}$$

Press $\boxed{Y=}$ on your graphing calculator to **enter your function**

Let $Y1 = x^2 - 2x - 8$, the left side of the equation

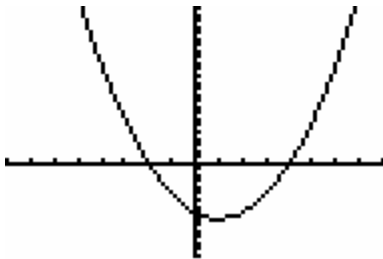
Let $Y2 = 0$, the right side of the equation

Press $\boxed{\text{WINDOW}}$ on your graphing calculator to set the **graphing window**

Let $Xmin = -8$, $Xmax = 8$, $Xscl = 1$, $Ymin = -15$, $Ymax = 25$, $Yscl = 1$, $Xres = 1$

Press $\boxed{\text{GRAPH}}$ on your graphing calculator to **graph the function**

Your graph should look similar to the graph below



Now find the x-intercept(s) of the graph; the intersection of the graphs.

Press $\boxed{2^{nd}} \boxed{\text{CALC}}$ **Intersect** and find the 1st point of intersection of the 2 graphs

$$\begin{aligned} x = -2 \quad y = 0 & \Rightarrow (-2,0) \text{ is a point of intersection of the 2 graphs} \\ & \Rightarrow x = -2 \text{ is a root of the equation} \end{aligned}$$

Press $\boxed{2^{nd}} \boxed{\text{CALC}}$ **Intersect** again and find the 2nd point of intersection of the 2 graphs

$$\begin{aligned} x = 4 \quad y = 0 & \Rightarrow (4,0) \text{ is a point of intersection of the 2 graphs} \\ & \Rightarrow x = 4 \text{ is a root of the equation} \end{aligned}$$

Conclusion: The solution to the equation $x^2 + 2x - 3 = 4x + 5$ is $x = -2$ or $x = 4$

Using the Graphing Calculator to Solve Equations (Zero Technique)

Solve the equation: $x^2 + 2x - 3 = 4x + 5$

Method 3 Using the x-intercept(s) of a Graph

First, you must set one side of the equation equal to zero

$$\begin{array}{r} x^2 + 2x - 3 = 4x + 5 \\ -4x - 5 \quad -4x - 5 \\ \hline x^2 - 2x - 8 = 0 \end{array}$$

Subtract $4x$ from both sides of the equation and
Subtract 5 from both sides of the equation.
is the resulting equivalent equation.

Press $\boxed{Y=}$ on your graphing calculator to **enter your function**

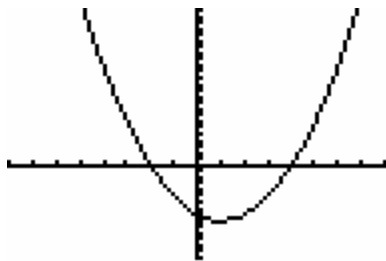
Let $Y1 = x^2 - 2x - 8$, the left side of the equation

Press $\boxed{\text{WINDOW}}$ on your graphing calculator to set the **graphing window**

Let $Xmin = -8$, $Xmax = 8$, $Xscl = 1$, $Ymin = -15$, $Ymax = 25$, $Yscl = 1$, $Xres = 1$

Press $\boxed{\text{GRAPH}}$ on your graphing calculator to **graph the function**

Your graph should look similar to the graph below



Now find the x-intercept(s) of the graph, which are the (real) zero(s) of the function

Press $\boxed{2^{nd}} \boxed{\text{CALC}}$ **zero** to find the 1st x-intercept of the graph

$$\begin{aligned} x = -2 \quad y = 0 &\Rightarrow x = -2 \text{ is an x-intercept of the graph} \\ &\Rightarrow x = -2 \text{ is a root of the equation} \end{aligned}$$

Press $\boxed{2^{nd}} \boxed{\text{CALC}}$ **zero** again to find the 2nd x-intercept of the graph

$$\begin{aligned} x = 4 \quad y = 0 &\Rightarrow x = 4 \text{ is an x-intercept of the graph} \\ &\Rightarrow x = 4 \text{ is a root of the equation} \end{aligned}$$

Conclusion: The solution to the equation $x^2 + 2x - 3 = 4x + 5$ is $x = -2$ or $x = 4$