Solving Non-Linear Systems of Equations - Example 2

Solving Non-Linear Systems of Equations - Example 2

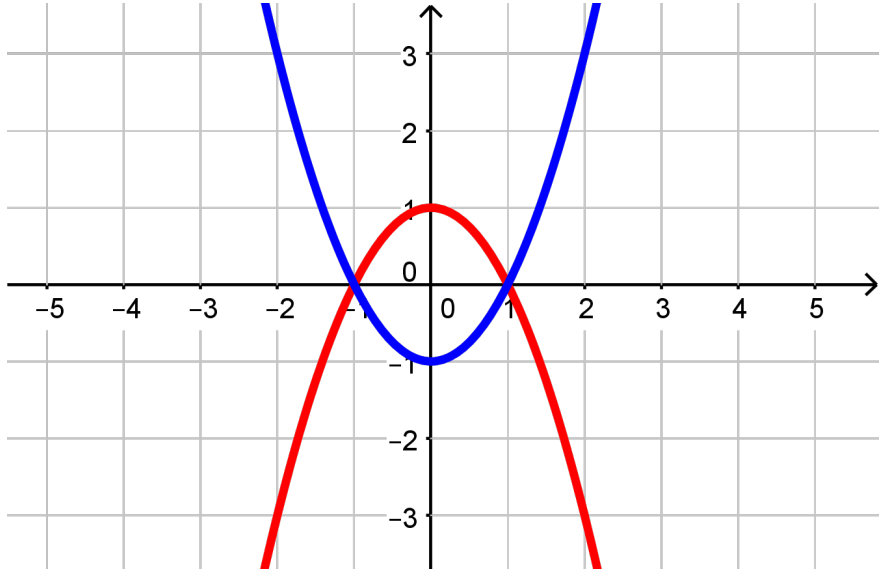
Example: Find solutions to the System of Equations:

$$y = 1 - x^2$$
$$y = x^2 - 1$$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

$$y = 1 - x^2$$
$$y = x^2 - 1$$

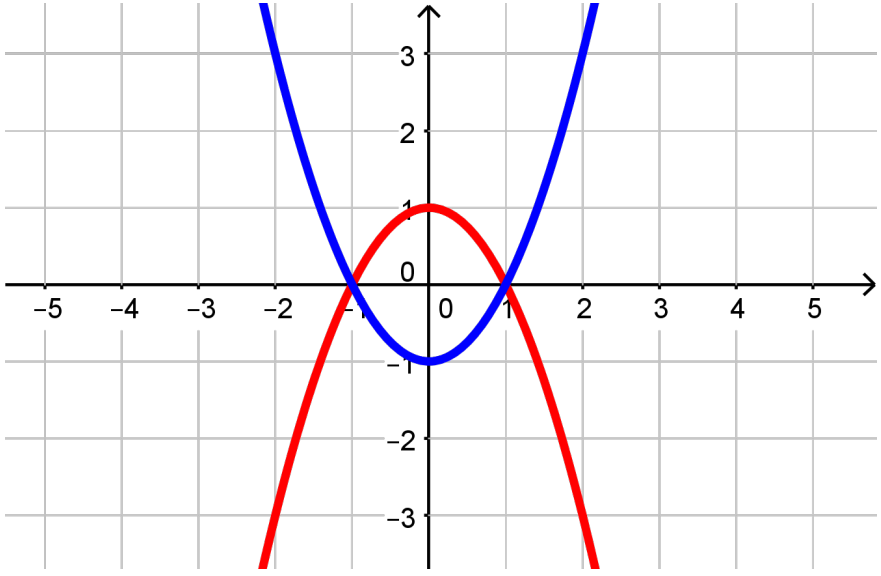


Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection



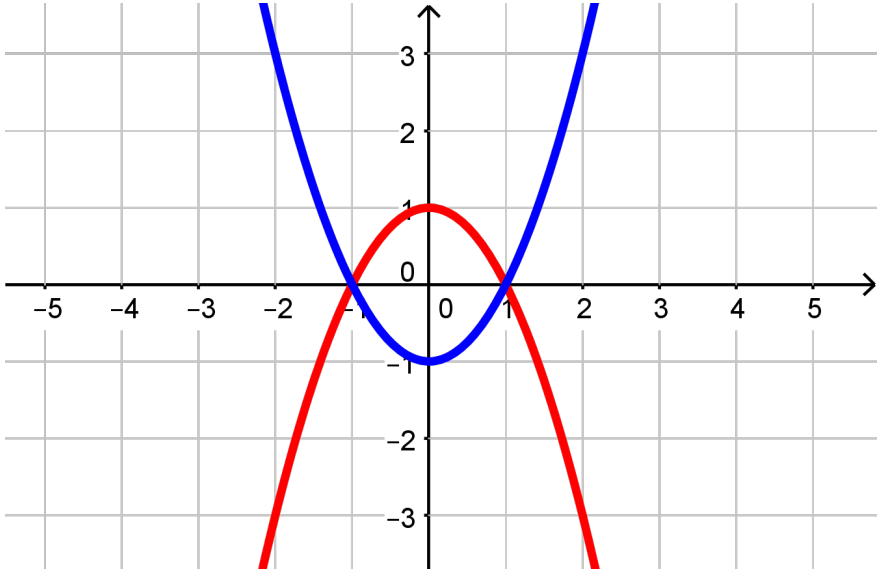
Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$



Solving Non-Linear Systems of Equations - Example 2

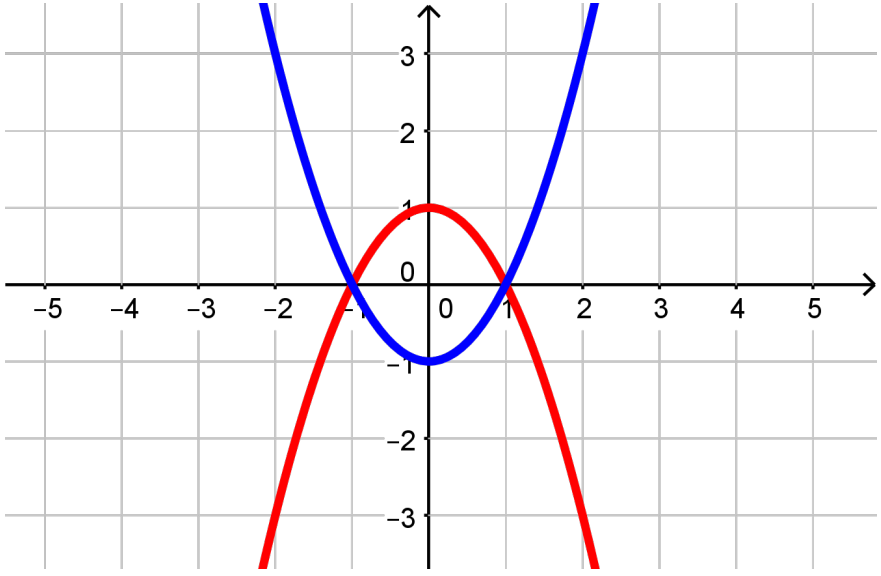
Example: Find solutions to the System of Equations:

$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$



Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

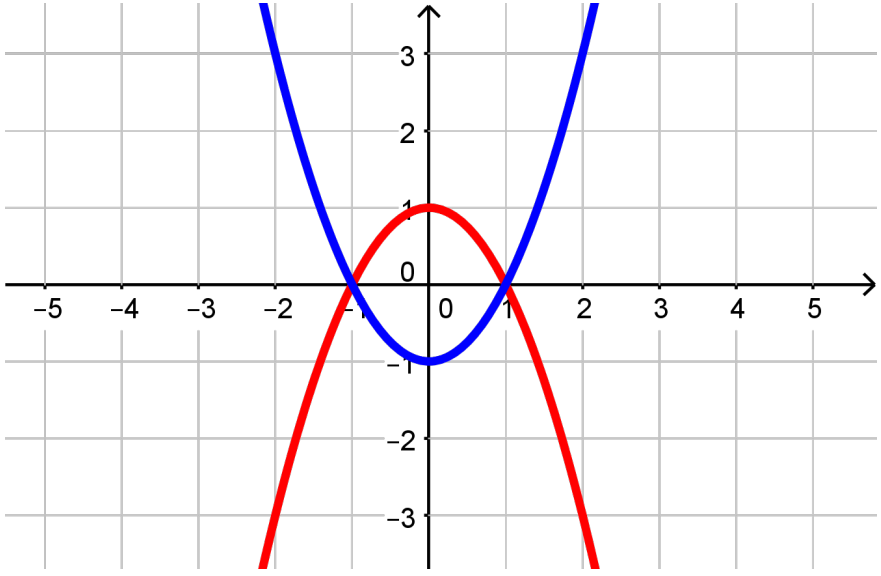
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

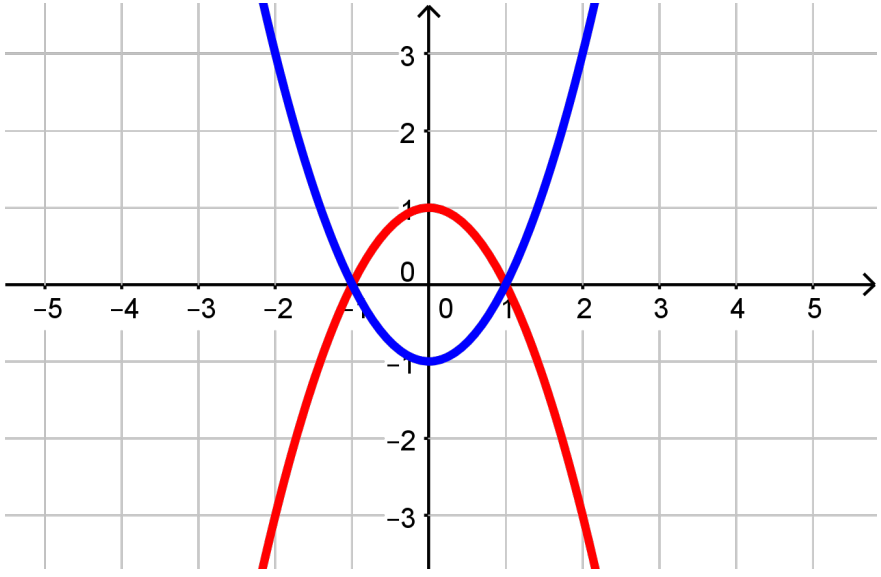
Here, we can solve for the $x-$value of the solution



Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

$$y = 1 - x^2$$
$$y = x^2 - 1$$



Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution

To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

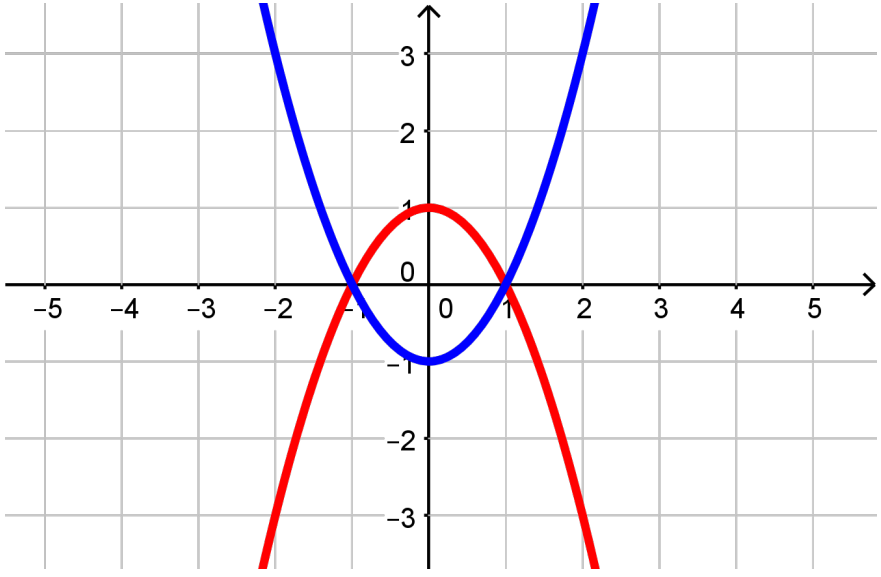
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$1 - x^2 + x^2 + 1 = x^2 - 1 + x^2 + 1$$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

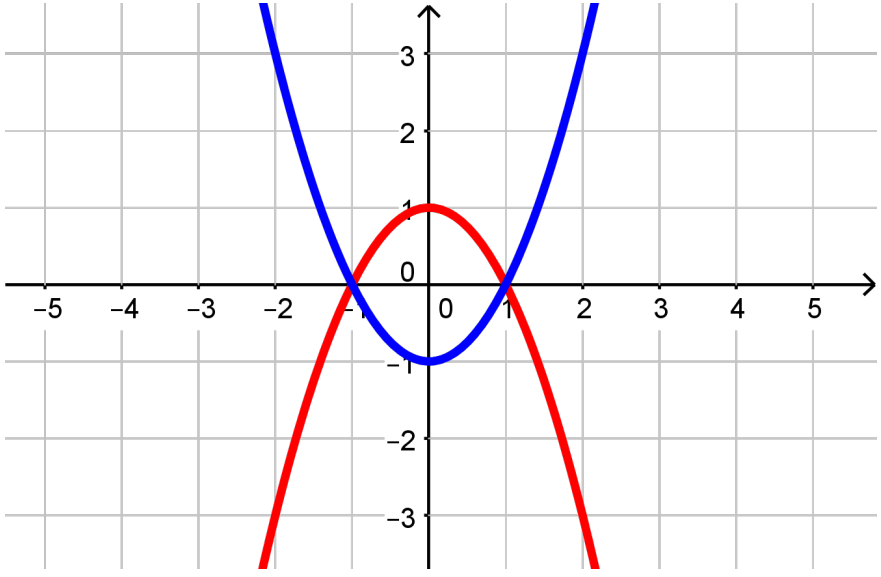
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$1 - x^2 + x^2 + 1 = x^2 \cancel{-1} + x^2 \cancel{+1} = 2x^2$$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

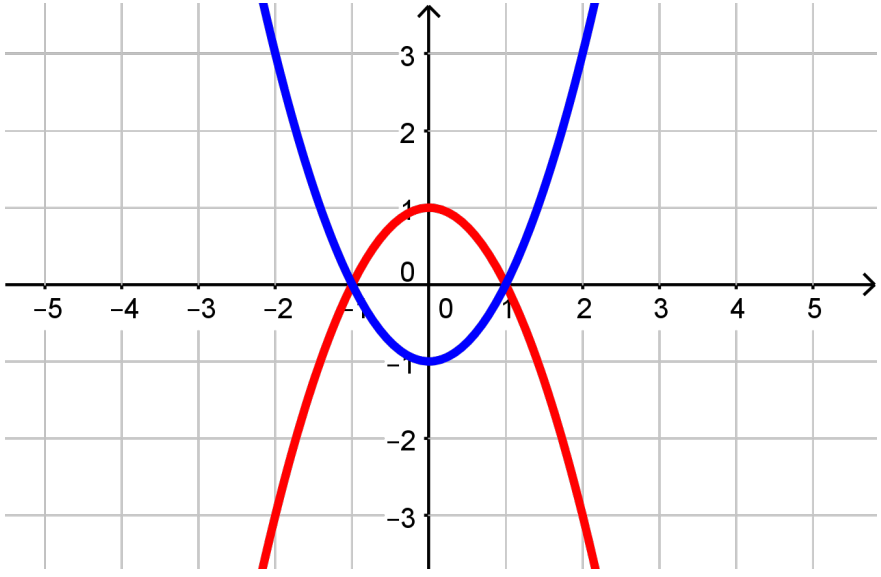
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



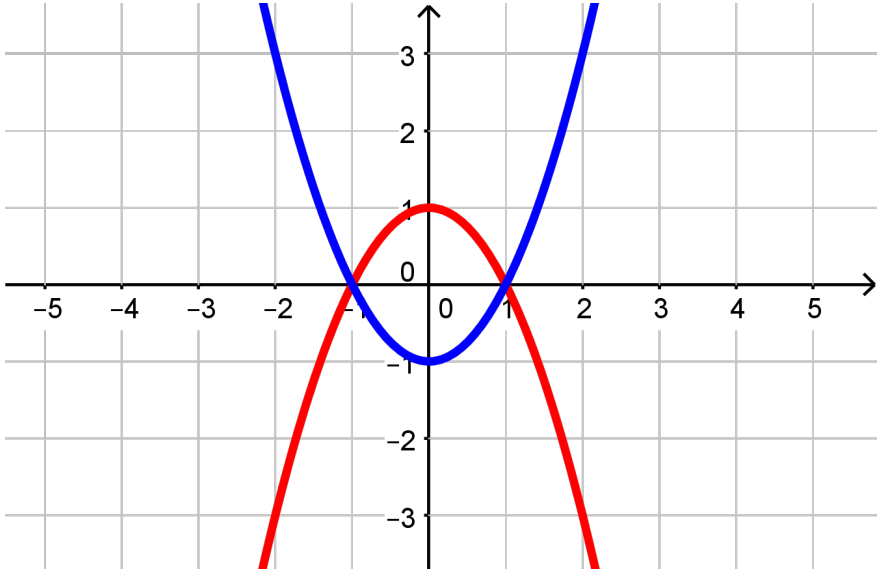
To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{- x^2} \cancel{+ x^2} + 1 = x^2 \cancel{- 1} + x^2 \cancel{+ 1} = 2x^2$$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

$$y = 1 - x^2$$
$$y = x^2 - 1$$



Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution

To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{- x^2} \cancel{+ x^2} + 1 = x^2 \cancel{- 1} + x^2 \cancel{+ 1} = 2x^2$$

Dividing by 2 gives: $x^2 = 1$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

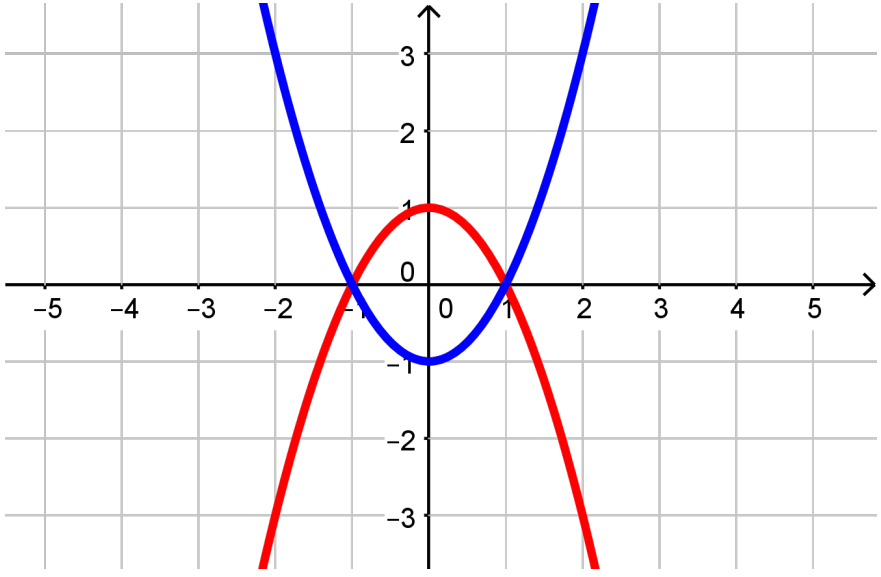
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{- x^2} \cancel{+ x^2} + 1 = x^2 \cancel{- 1} + x^2 \cancel{+ 1} = 2x^2$$

Dividing by 2 gives: $x^2 = 1 \rightarrow x = -1, 1$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

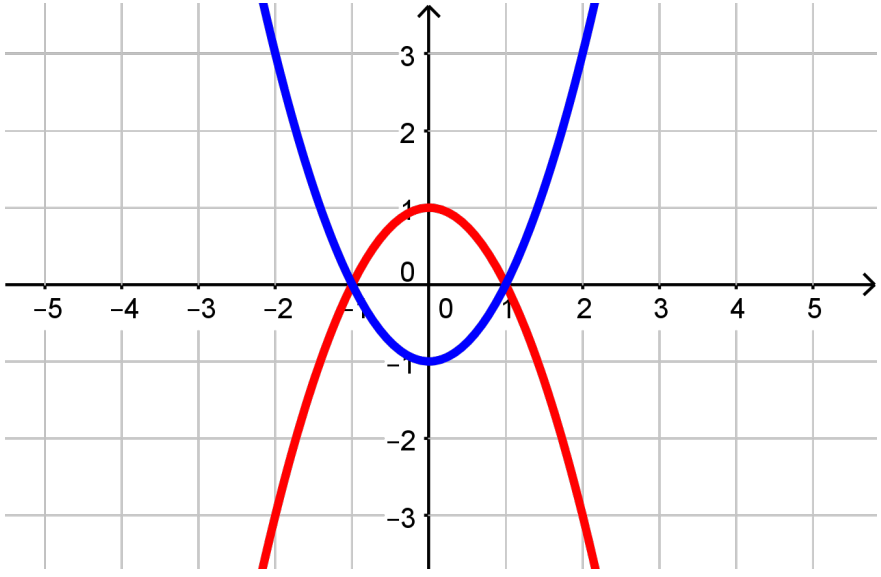
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{- x^2} \cancel{+ x^2} + 1 = x^2 \cancel{- 1} + x^2 \cancel{+ 1} = 2x^2$$

Dividing by 2 gives: $x^2 = 1 \rightarrow x = -1, 1$

We can use the $x-$values of the points $x = -1, 1$ to find the $y-$values

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

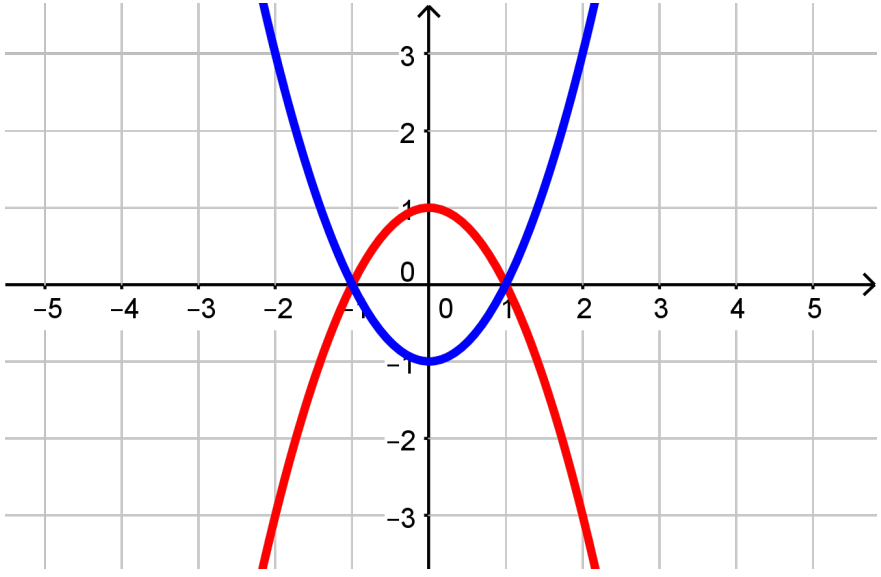
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{-x^2} \cancel{+x^2} + 1 = x^2 \cancel{-1} + x^2 \cancel{+1} = 2x^2$$

Dividing by 2 gives: $x^2 = 1 \rightarrow x = -1, 1$

We can use the $x-$values of the points $x = -1, 1$ to find the $y-$values

For $x = -1$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

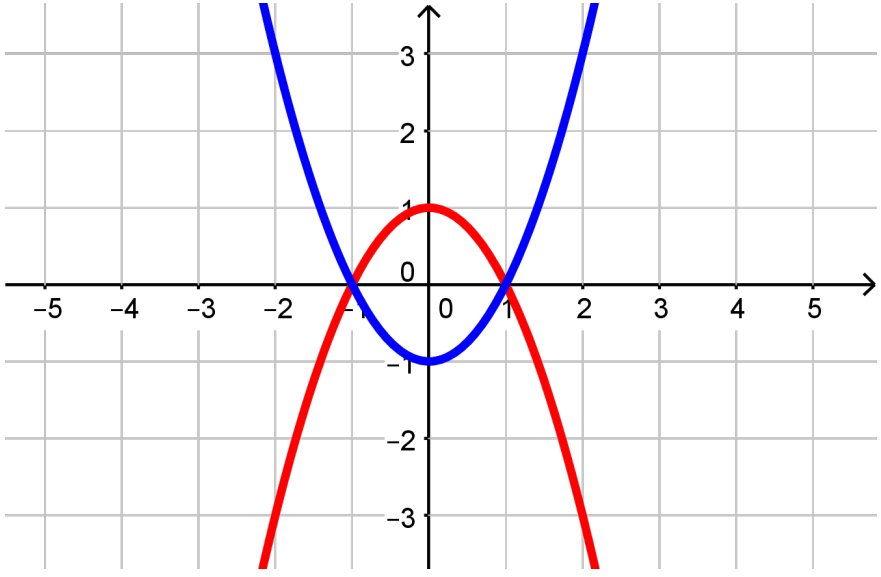
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{-x^2} \cancel{+x^2} + 1 = x^2 \cancel{-1} + x^2 \cancel{+1} = 2x^2$$

Dividing by 2 gives: $x^2 = 1 \rightarrow x = -1, 1$

We can use the $x-$values of the points $x = -1, 1$ to find the $y-$values

For $x = -1$: $y = (-1)^2 - 1$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

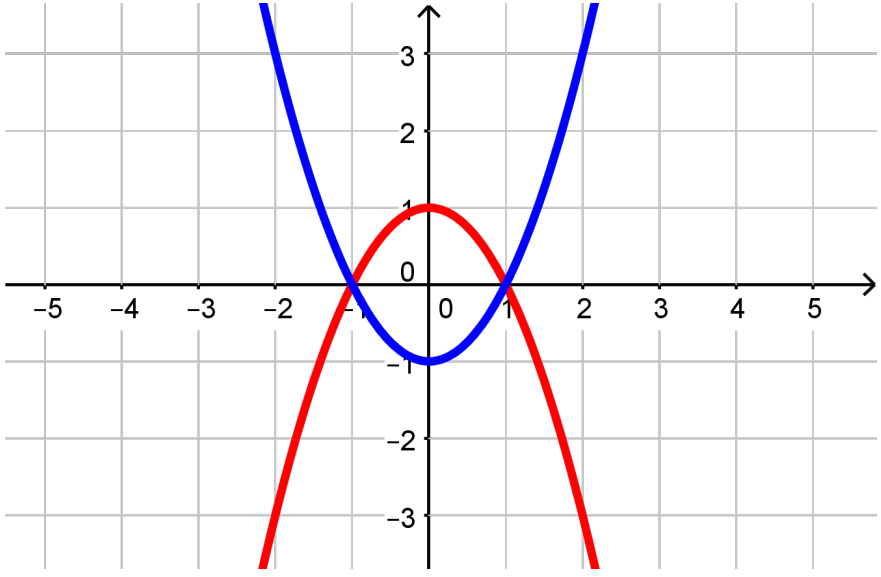
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{-x^2} \cancel{+x^2} + 1 = x^2 \cancel{-1} + x^2 \cancel{+1} = 2x^2$$

Dividing by 2 gives: $x^2 = 1 \rightarrow x = -1, 1$

We can use the $x-$values of the points $x = -1, 1$ to find the $y-$values

For $x = -1$: $y = (-1)^2 - 1 = 0$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

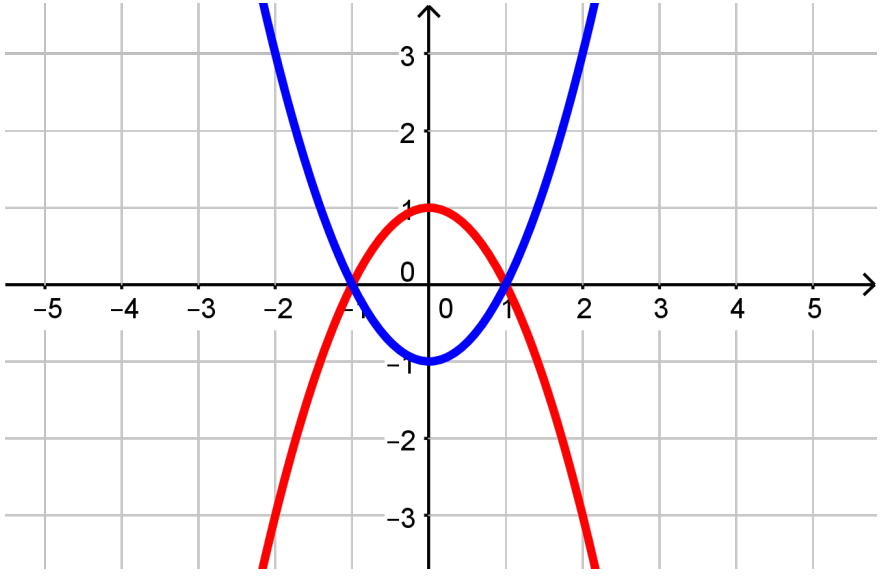
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{- x^2} \cancel{+ x^2} + 1 = x^2 \cancel{- 1} + x^2 \cancel{+ 1} = 2x^2$$

Dividing by 2 gives: $x^2 = 1 \rightarrow x = -1, 1$

We can use the $x-$values of the points $x = -1, 1$ to find the $y-$values

For $x = -1$: $y = (-1)^2 - 1 = 0 \rightarrow$ A solution is: $(-1, 0)$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

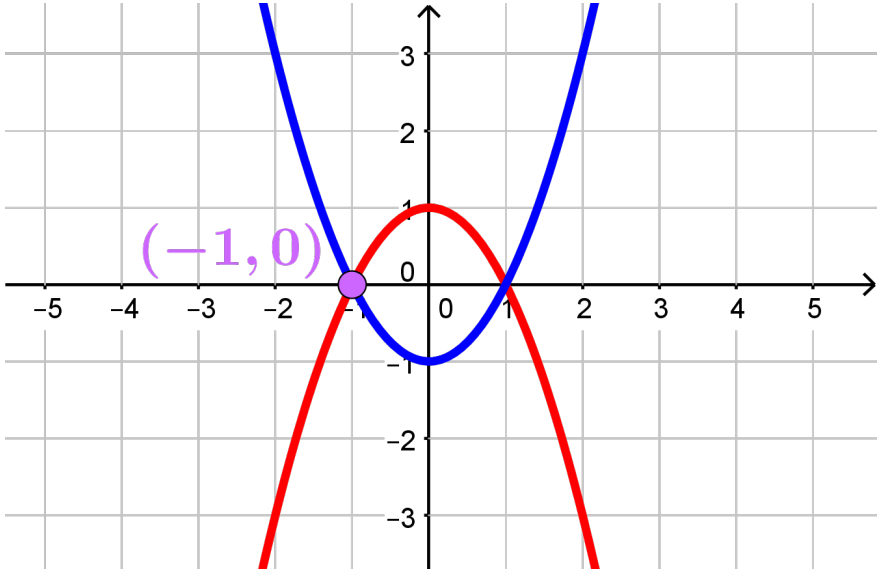
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{-x^2} \cancel{+x^2} + 1 = x^2 \cancel{-1} + x^2 \cancel{+1} = 2x^2$$

Dividing by 2 gives: $x^2 = 1 \rightarrow x = -1, 1$

We can use the $x-$values of the points $x = -1, 1$ to find the $y-$values

For $x = -1$: $y = (-1)^2 - 1 = 0 \rightarrow$ A solution is: $(-1, 0)$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

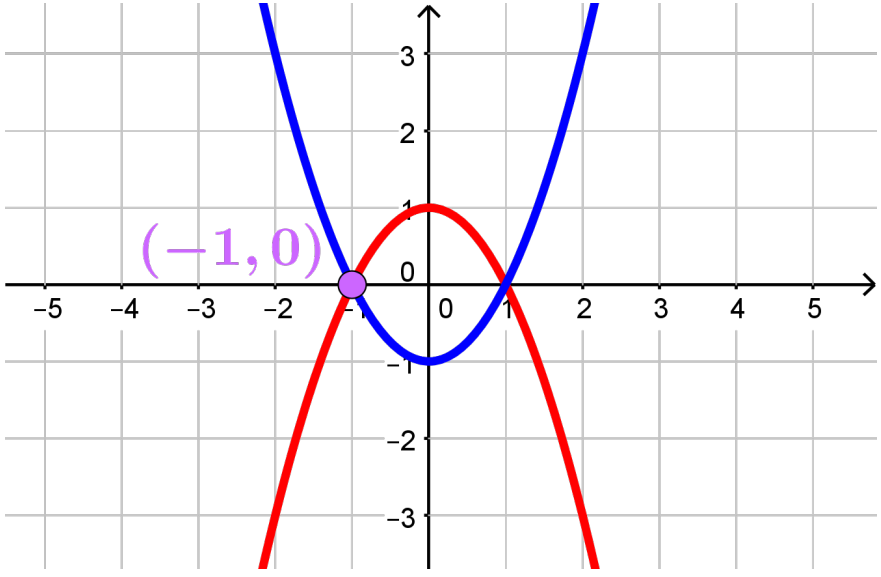
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{-x^2} \cancel{+x^2} + 1 = x^2 \cancel{-1} + x^2 \cancel{+1} = 2x^2$$

Dividing by 2 gives: $x^2 = 1 \rightarrow x = -1, 1$

We can use the $x-$values of the points $x = -1, 1$ to find the $y-$values

For $x = -1$: $y = (-1)^2 - 1 = 0 \rightarrow$ A solution is: $(-1, 0)$

For $x = 1$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

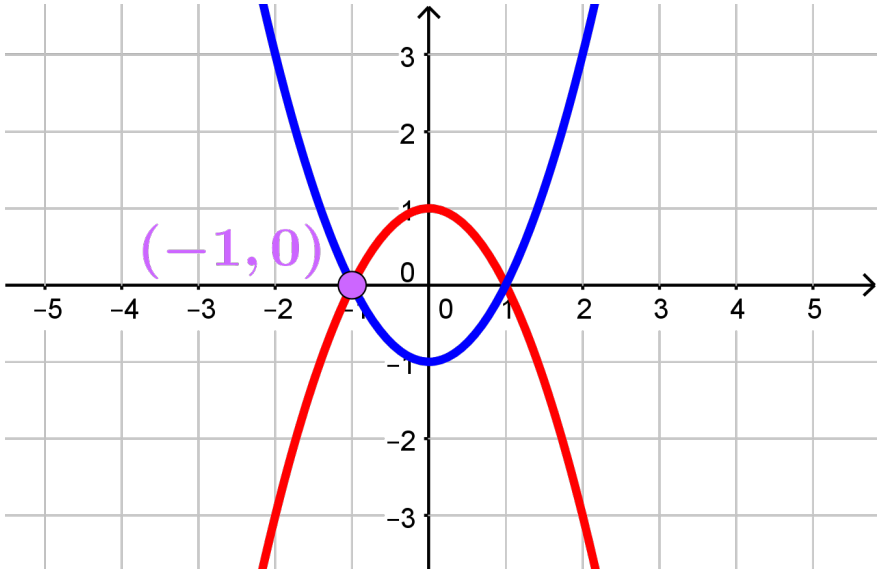
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{-x^2} \cancel{+x^2} + 1 = x^2 \cancel{-1} + x^2 \cancel{+1} = 2x^2$$

Dividing by 2 gives: $x^2 = 1 \rightarrow x = -1, 1$

We can use the $x-$values of the points $x = -1, 1$ to find the $y-$values

For $x = -1$: $y = (-1)^2 - 1 = 0 \rightarrow$ A solution is: $(-1, 0)$

For $x = 1$: $y = (1)^2 - 1$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

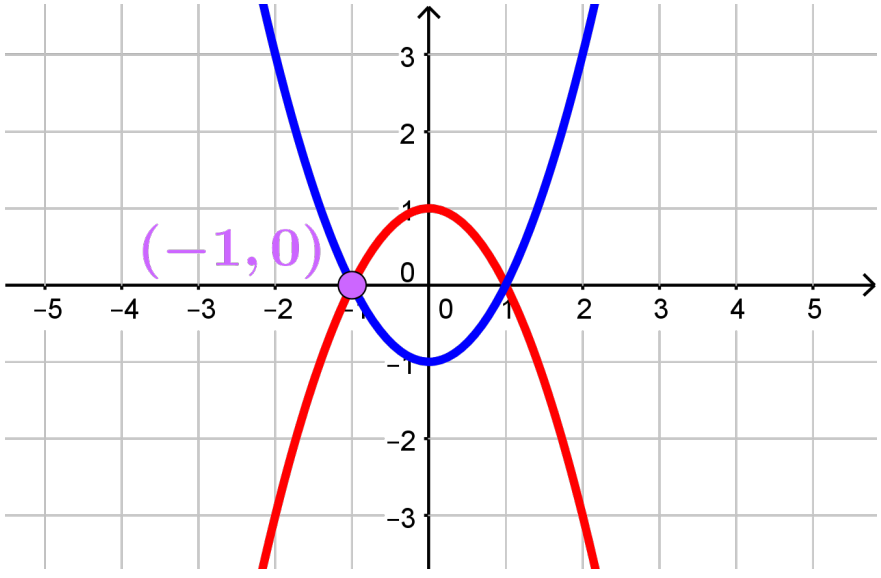
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{-x^2} \cancel{+x^2} + 1 = x^2 \cancel{-1} + x^2 \cancel{+1} = 2x^2$$

Dividing by 2 gives: $x^2 = 1 \rightarrow x = -1, 1$

We can use the $x-$values of the points $x = -1, 1$ to find the $y-$values

For $x = -1$: $y = (-1)^2 - 1 = 0 \rightarrow$ A solution is: $(-1, 0)$

For $x = 1$: $y = (1)^2 - 1 = 0$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

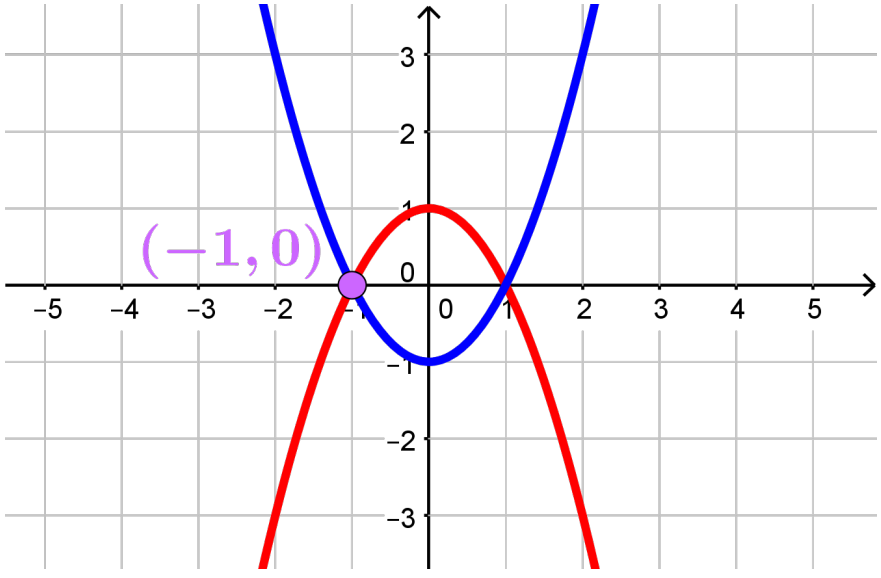
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{-x^2} \cancel{+x^2} + 1 = x^2 \cancel{-1} + x^2 \cancel{+1} = 2x^2$$

Dividing by 2 gives: $x^2 = 1 \rightarrow x = -1, 1$

We can use the $x-$values of the points $x = -1, 1$ to find the $y-$values

For $x = -1$: $y = (-1)^2 - 1 = 0 \rightarrow$ A solution is: $(-1, 0)$

For $x = 1$: $y = (1)^2 - 1 = 0 \rightarrow$ A solution is: $(1, 0)$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

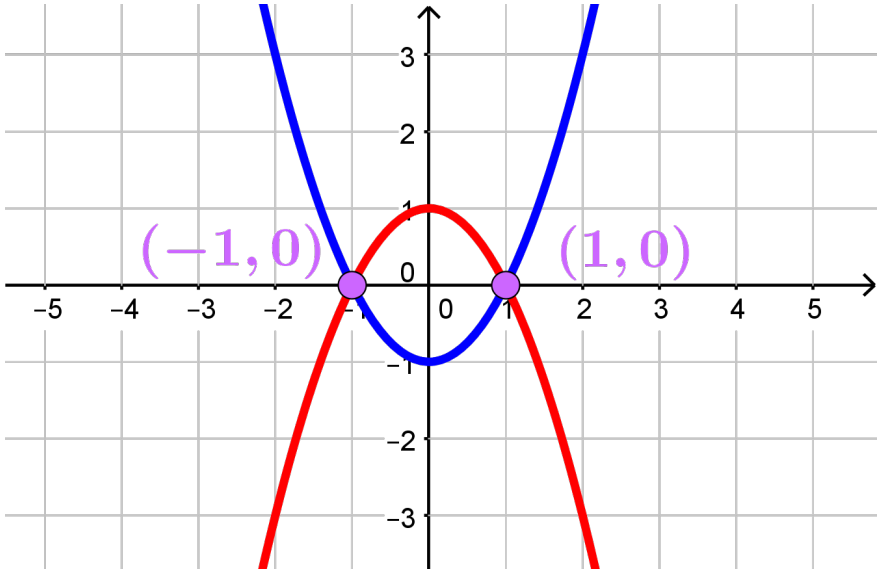
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{- x^2} \cancel{+ x^2} + 1 = x^2 \cancel{- 1} + x^2 \cancel{+ 1} = 2x^2$$

Dividing by 2 gives: $x^2 = 1 \rightarrow x = -1, 1$

We can use the $x-$values of the points $x = -1, 1$ to find the $y-$values

For $x = -1$: $y = (-1)^2 - 1 = 0 \rightarrow$ A solution is: $(-1, 0)$

For $x = 1$: $y = (1)^2 - 1 = 0 \rightarrow$ A solution is: $(1, 0)$

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

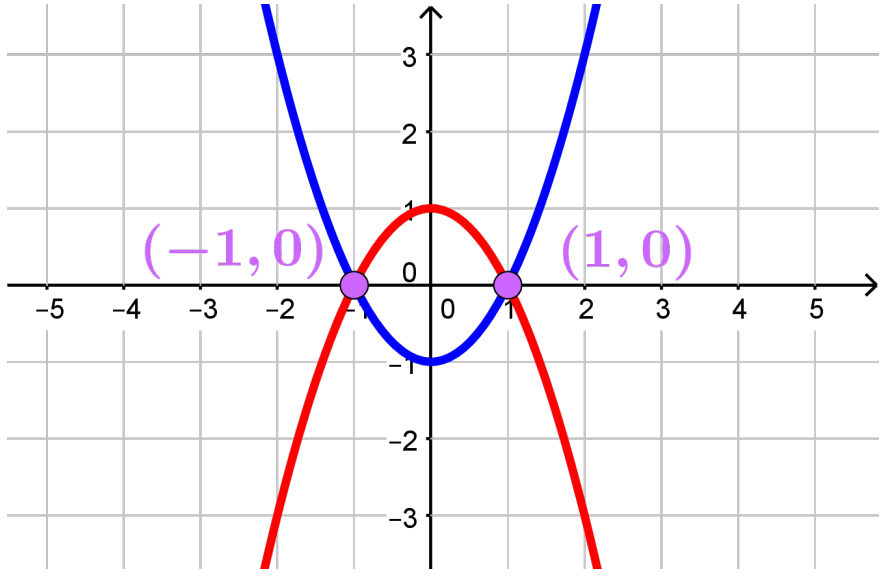
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{- x^2} \cancel{+ x^2} + 1 = x^2 \cancel{- 1} + x^2 \cancel{+ 1} = 2x^2$$

Dividing by 2 gives: $x^2 = 1 \rightarrow x = -1, 1$

We can use the $x-$values of the points $x = -1, 1$ to find the $y-$values

For $x = -1$: $y = (-1)^2 - 1 = 0 \rightarrow$ A solution is: $(-1, 0)$

For $x = 1$: $y = (1)^2 - 1 = 0 \rightarrow$ A solution is: $(1, 0)$

Note: We can use either equation, because solutions are to both!

Solving Non-Linear Systems of Equations - Example 2

Example: Find solutions to the System of Equations:

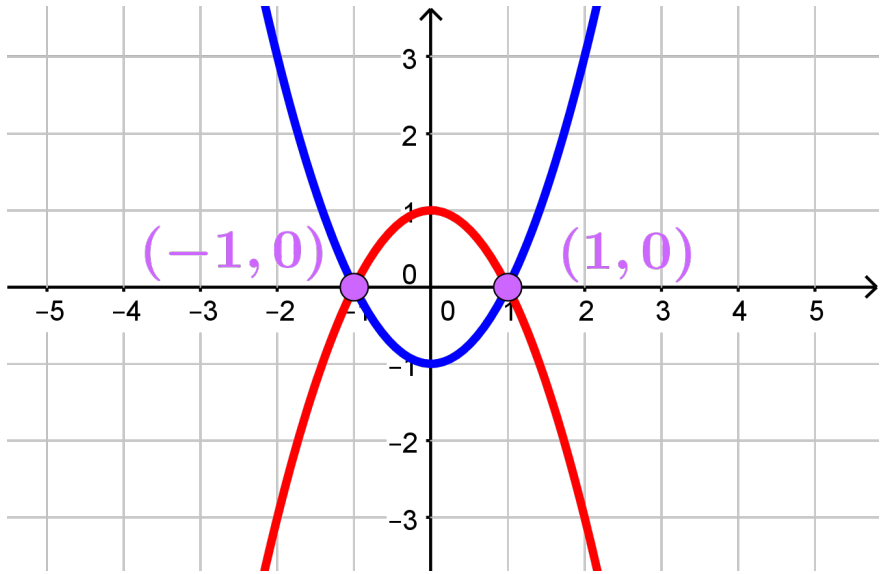
$$y = 1 - x^2$$
$$y = x^2 - 1$$

Graphically, solutions are the Points of Intersection

Algebraically, we look at: $y = y$

$$1 - x^2 = x^2 - 1$$

Here, we can solve for the $x-$value of the solution



To solve for x, we can isolate x^2 on one side by Adding $x^2 + 1$

$$2 = 1 \cancel{- x^2} \cancel{+ x^2} + 1 = x^2 \cancel{- 1} + x^2 \cancel{+ 1} = 2x^2$$

Dividing by 2 gives: $x^2 = 1 \rightarrow x = -1, 1$

We can use the $x-$values of the points $x = -1, 1$ to find the $y-$values

For $x = -1$: $y = (-1)^2 - 1 = 0 \rightarrow$ A solution is: $(-1, 0)$

For $x = 1$: $y = (1)^2 - 1 = 0 \rightarrow$ A solution is: $(1, 0)$

Note: We can use either equation, because solutions are to both!

Note: The graph was not used to find solutions, only to visualize them