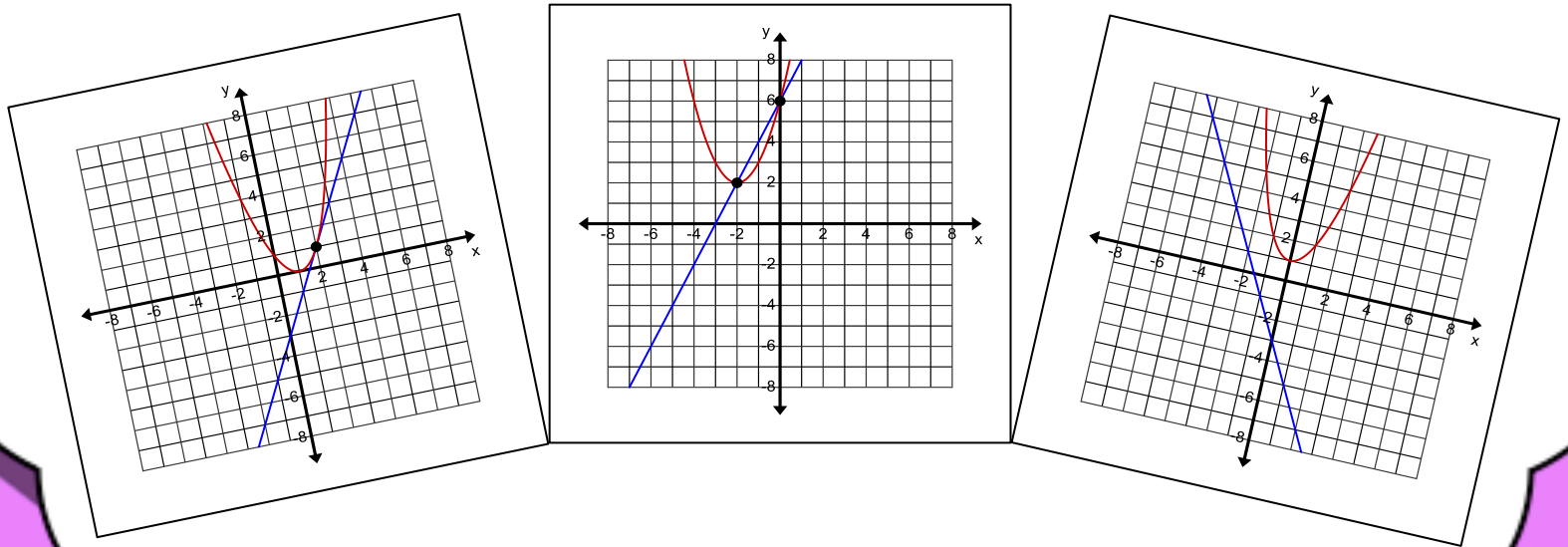
Solving Nonlinear Systems



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Instructions

Print or copy page 3 and 4 double sided.

Place the paper so the examples are face down.

Fold inwards on the solid line so the 3 boxes are above the Solving Nonlinear Systems.

Cut along the dotted lines to create flaps.

Glue the foldable into notes or on a piece of construction paper.

Go through the foldable with your students.

Preview

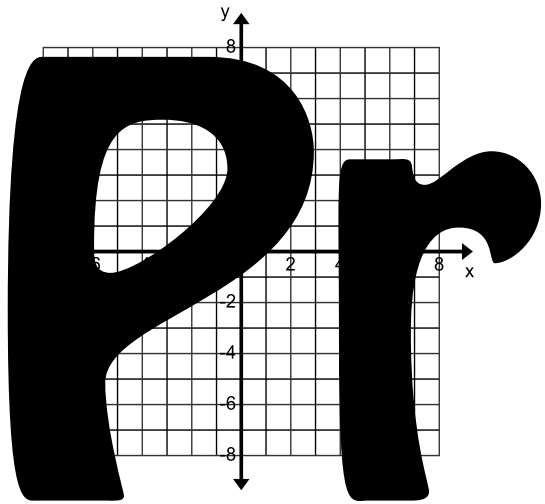
One Solution	Two Solutions	No Solution

One Solution

$y = 2x - 3$

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

x	$y = x^2 - 2x + 1$	y
-1		
0		
1		
2		
3		



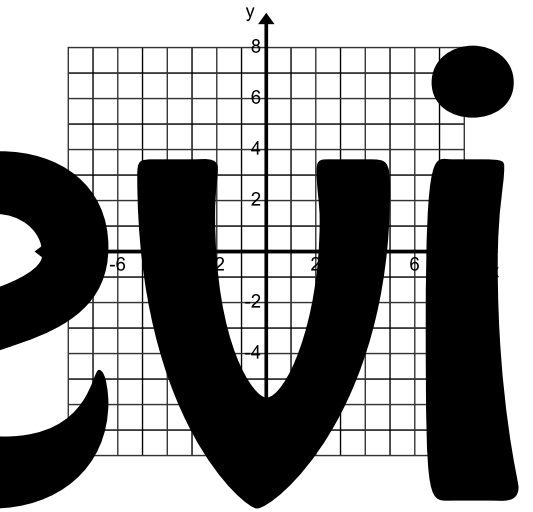
The solution is

Two Solutions

$y = 2x + 6$

$y = x^2 + 4x + 6$

x	$y = x^2 + 4x + 6$	y
-4		
-3		
-2		
-1		
0		



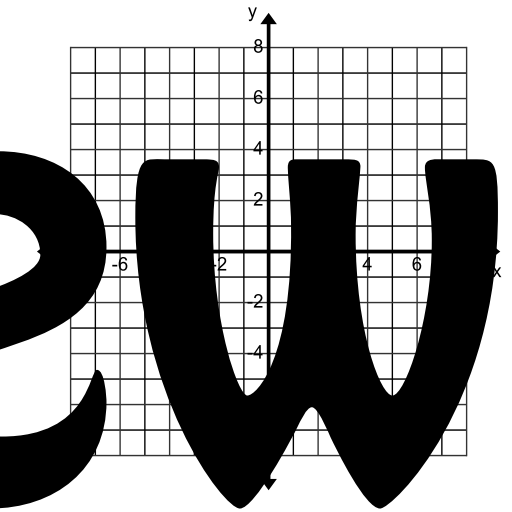
The solutions are

No Solution

$y = -2x - 3$

$y = x^2 + 1$

x	$y = x^2 + 1$	y
-2		
-1		
0		
1		
2		



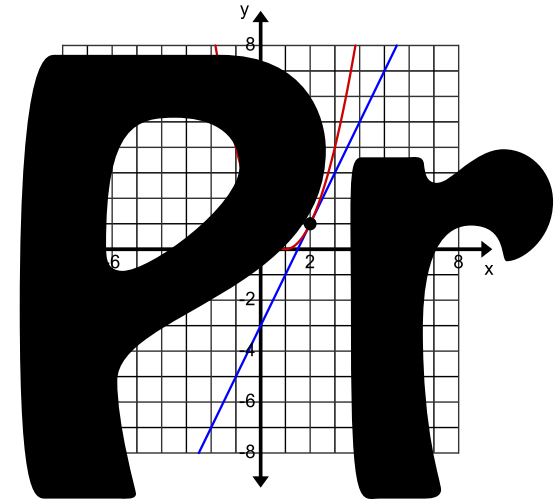
There is no real solution

Solving Nonlinear Systems

One Solution

$y = 2x - 3$
$y = x^2 - 2x + 1$

x	$y = x^2 - 2x + 1$	y
-1	$(-1)^2 - 2(-1) + 1$	4
0	$(0)^2 - 2(0) + 1$	1
1	$(1)^2 - 2(1) + 1$	0
2	$(2)^2 - 2(2) + 1$	1
3	$(3)^2 - 2(3) + 1$	4



$x^2 - 2x + 1 = 2x - 3$
$x^2 - 4x + 4 = 0$
$(x - 2)^2 = 0$
$x - 2 = 0$
$x = 2$

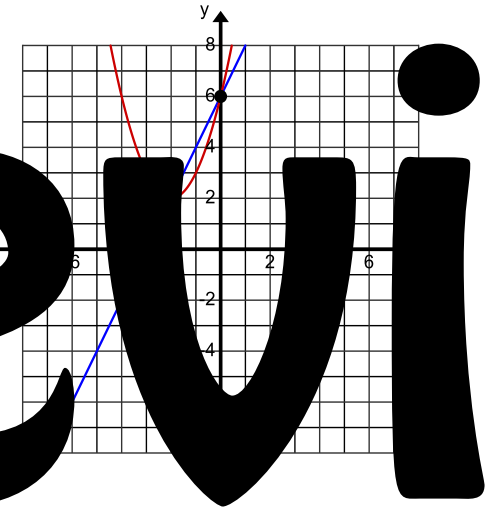
$y = 2x - 3$
$y = 2(2) - 3 = 4 - 3 = 1$

The solution is (2, 1)

Two Solutions

$y = 2x + 6$
$y = x^2 + 4x + 6$

x	$y = x^2 + 4x + 6$	y
-4	$(-4)^2 + 4(-4) + 6$	6
-3	$(-3)^2 + 4(-3) + 6$	3
-2	$(-2)^2 + 4(-2) + 6$	2
-1	$(-1)^2 + 4(-1) + 6$	3
0	$(0)^2 + 4(0) + 6$	6



$x^2 + 4x + 6 = 2x + 6$
$x^2 + 2x = 0$
$x(x + 2) = 0$
$x = 0$ $\qquad$ $x + 2 = 0$
$x = -2$

$y = 2x + 6$
$y = 2(0) + 6$
$y = 6$

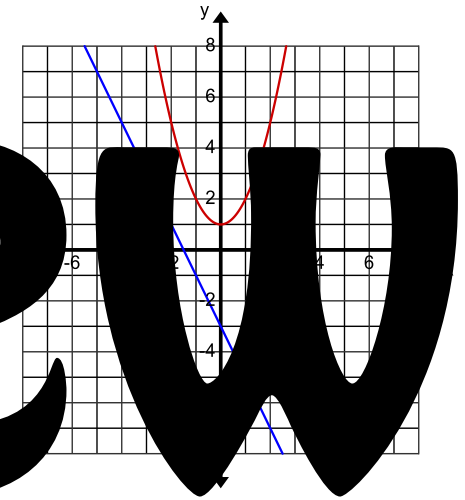
$y = 2x + 6$
$y = 2(-2) + 6$
$y = 2$

The solutions are (0, 6) and (-2, 2)

No Solution

$y = -2x - 3$
$y = x^2 + 1$

x	$y = x^2 + 1$	y
-2	$(-2)^2 + 1$	5
-1	$(-1)^2 + 1$	2
0	$(0)^2 + 1$	1
1	$(1)^2 + 1$	2
2	$(2)^2 + 1$	5



$x^2 + 1 = -2x - 3$
$x^2 + 2x + 4 = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-2 \pm \sqrt{2^2 - 4(1)(4)}}{2(1)}$$

$$= \frac{-2 \pm \sqrt{4 - 16}}{2}$$

$$= \frac{-2 \pm \sqrt{-12}}{2} = -1 \pm i\sqrt{3}$$

There is no real solution

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