Fractions and Radicals

Warmup - Reduce

1. $\dfrac{\sqrt{10}}{\sqrt{2}}$ $\sqrt{5}$

2. $\dfrac{\sqrt{12}}{\sqrt{3}}$ 2

3. $\sqrt{\dfrac{22}{4}}$ $\dfrac{\sqrt{22}}{2}$

4. $\dfrac{\sqrt{21}}{\sqrt{2}}$ $\dfrac{\sqrt{42}}{2}$

5. $\dfrac{\sqrt[3]{125}}{\sqrt[3]{5}}$ $\sqrt[3]{25}$

6. $\sqrt[3]{\dfrac{21}{2}}$ $\dfrac{\sqrt[3]{84}}{2}$

3.2 - Complex Numbers

Rational denominator

$$\frac{5-i}{2+3i}\cdot\frac{2-3i}{2-3i}=\frac{10-17i+3i^2}{4-9i^2}=\frac{7-17i}{13}=\frac{7}{13}-\frac{17}{13}i$$

3.2 - Complex Numbers

Simplify

$$\frac{5-i}{2+3i}\cdot\frac{2-3i}{2-3i}=\frac{10-17i+3i^2}{4-9i^2}=\frac{7-17i}{13}=\frac{7}{13}-\frac{17}{13}i$$

Practice

1. $\dfrac{5}{3+4i}$ $\quad\dfrac{3}{5}-\dfrac{4}{5}i$

2. $\dfrac{-1-2i}{-1+2i}$ $\quad-\dfrac{3}{5}+\dfrac{4}{5}i$

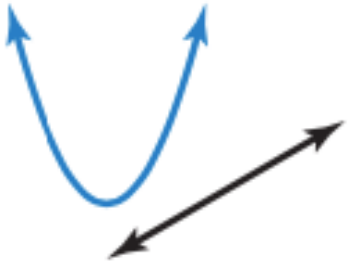
3. $\dfrac{5+i}{5-i}$ $\quad\dfrac{12}{13}+\dfrac{5}{13}i$

Chapter 3
Quadratic Equations and Complex Numbers

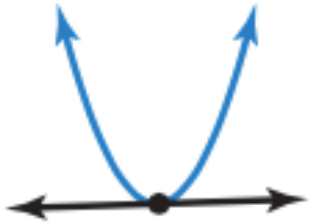
1. Solving Quadratic Equations
2. Complex Numbers
3. Completing the Square
4. Using the Quadratic Formula
5. **Solving Nonlinear Systems**
6. Quadratic Inequalities

3.5 - Solving Nonlinear Systems

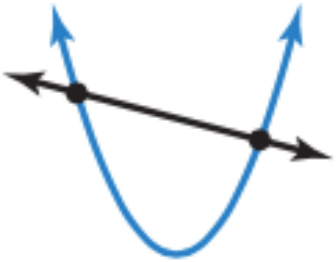
Linear and Nonlinear Equations



No solution

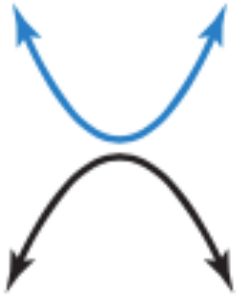


One solution



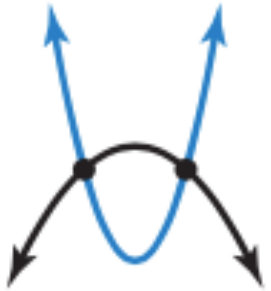
Two solutions

Nonlinear Equations



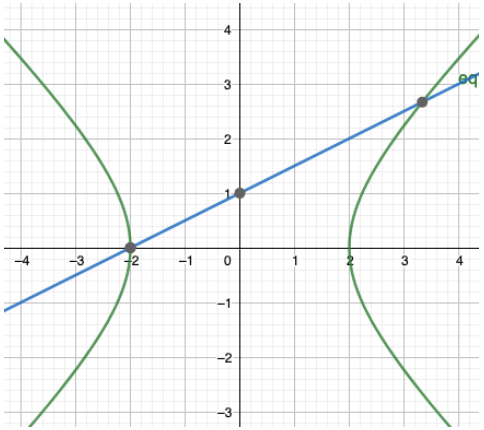
No solution

One solution



Two solutions

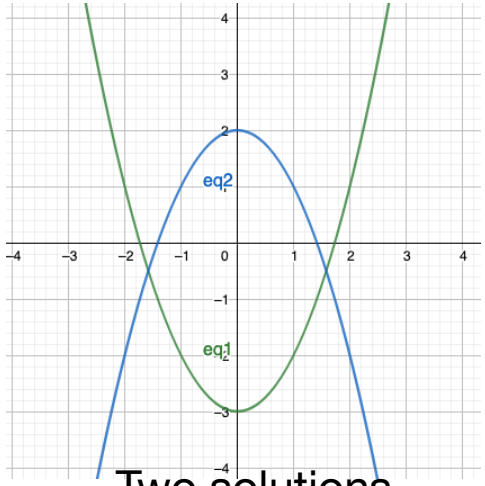
3.5 - Solving Nonlinear Systems



Two solutions

$x^2 - y^2 = 4$

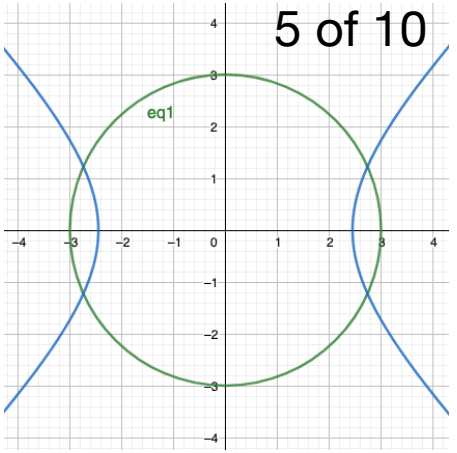
$x - 2y + 2 = 0$



Two solutions

$x^2 - y = 3$

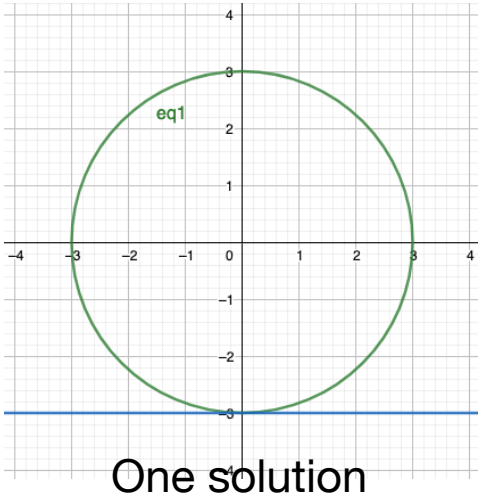
$x^2 + y = 2$



Four solutions

$x^2 - y^2 = 6$

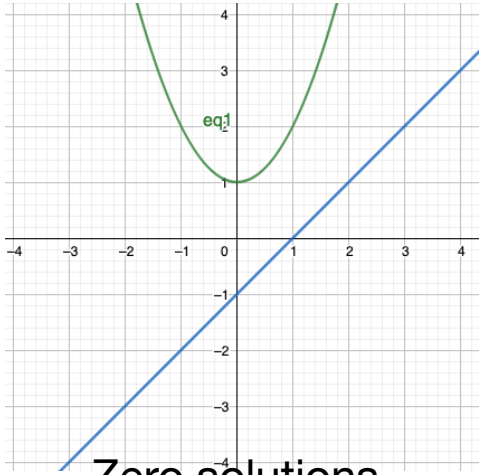
$x^2 + y^2 = 9$



One solution

$x^2 + y^2 = 9$

$y = -3$



Zero solutions

$x^2 - y = -1$

$-x + y = -1$

3.5 - Solving Nonlinear Systems

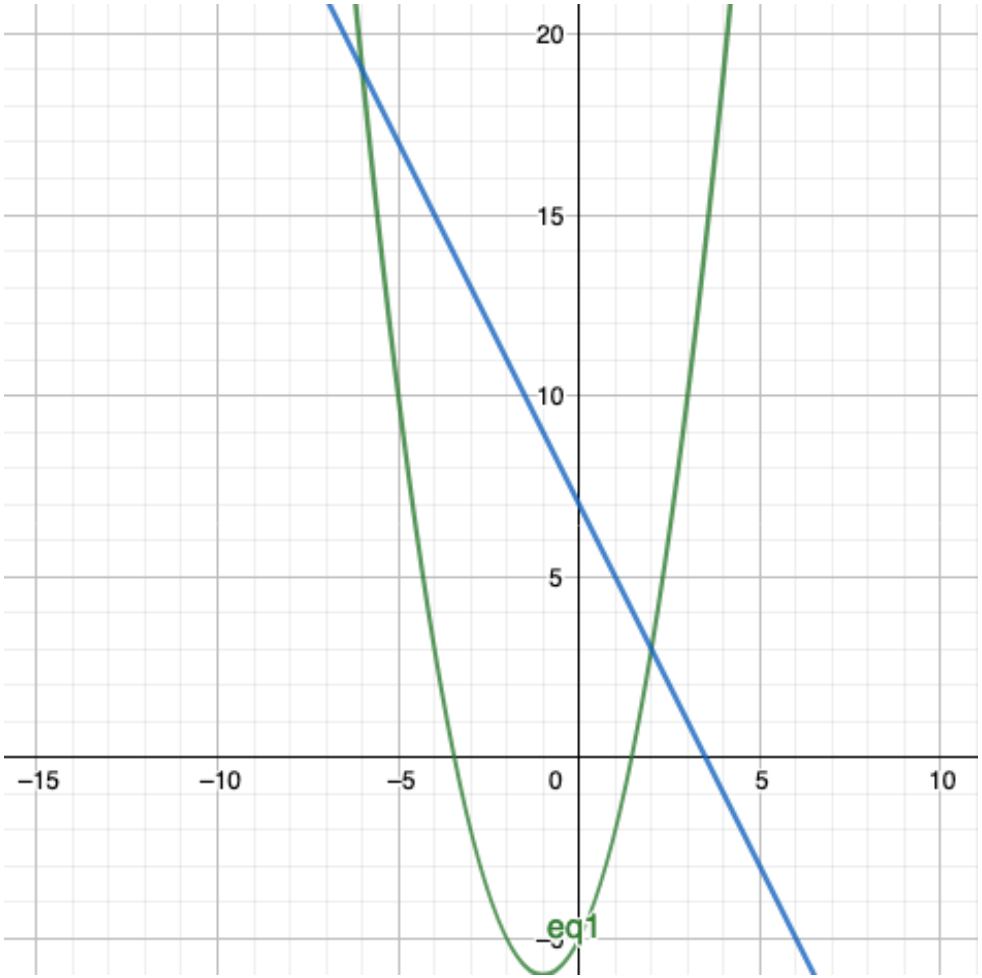
Solve by substitution

$$x^2 + 2x - y = 5$$

$$2x + y = 7$$

$(-6, 19)$

$(2, 3)$



3.5 - Solving Nonlinear Systems

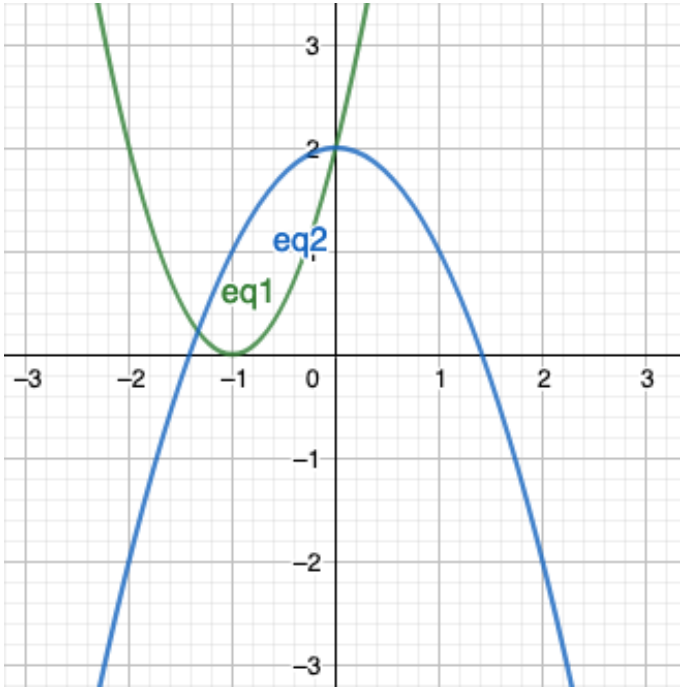
Solve by elimination

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

$$x^2 + y = 2$$

$$\left(-\frac{4}{3}, \frac{2}{9}\right)$$

$$(0, 2)$$



3.5 - Solving Nonlinear Systems

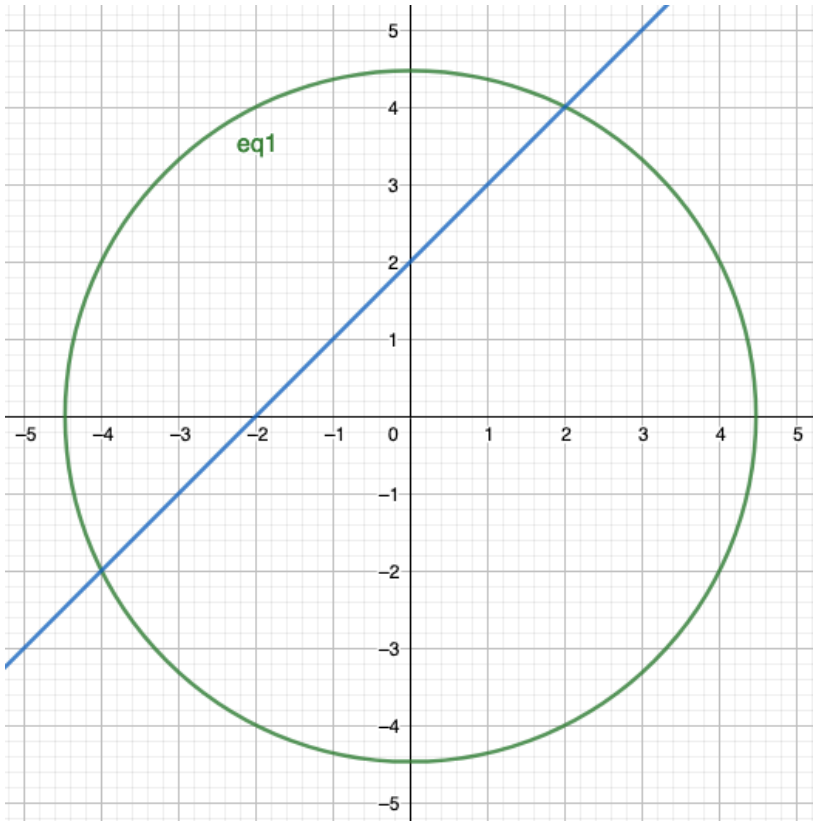
Solve by substitution

$$x^2 + y^2 = 20$$

$$y = x + 2$$

$(2, 4)$

$(-4, -2)$



3.5 - Solving Nonlinear Systems

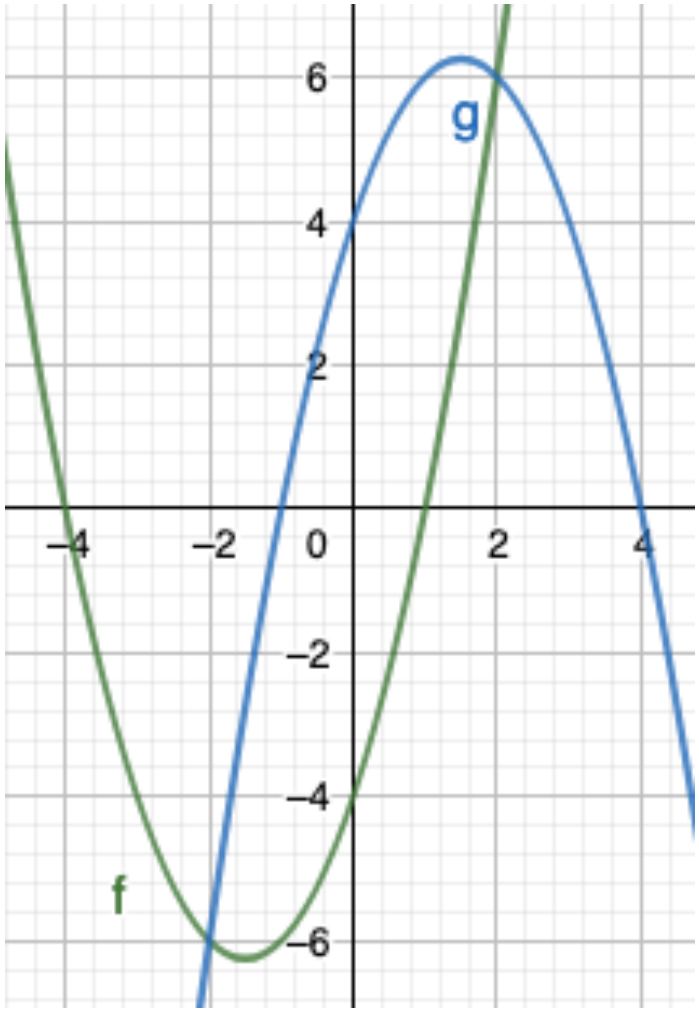
Solve by any method

$y = (x + 4)(x - 1)$

$y = -x^2 + 3x + 4$

$(2, 6)$

$(-2, -6)$

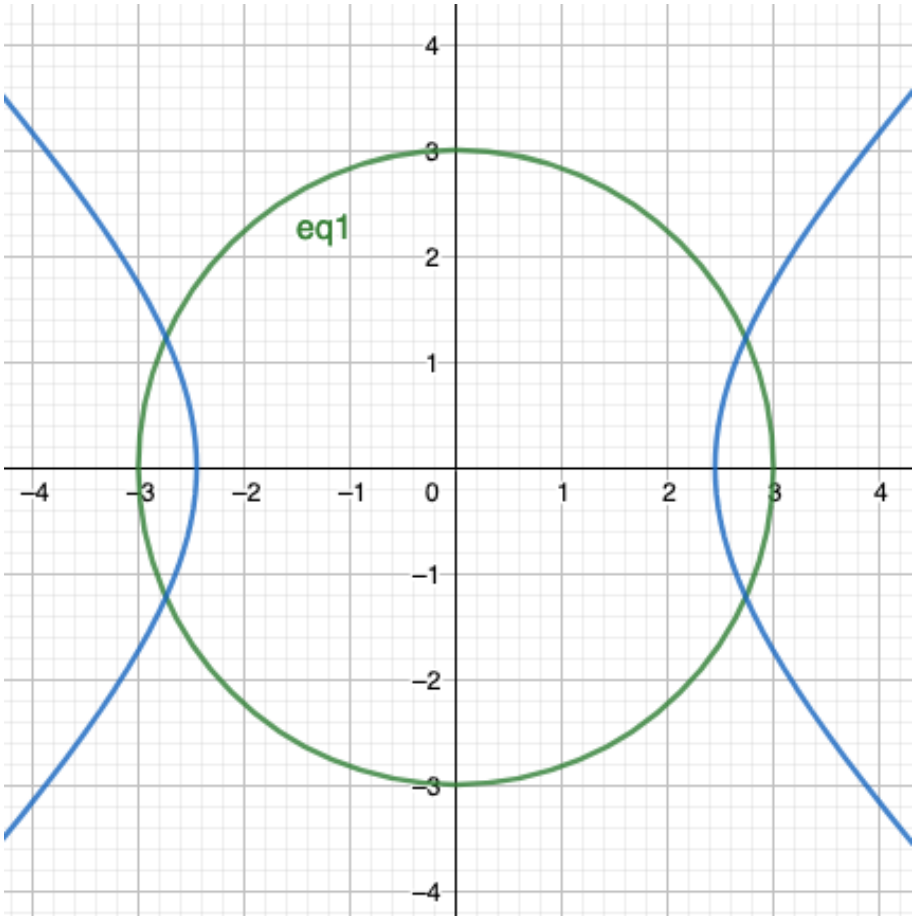


3.5 - Solving Nonlinear Systems

Solve by any method

$$x^2 - y^2 = 6$$
$$x^2 + y^2 = 9$$

$$\left(\frac{\sqrt{30}}{2}, \frac{\sqrt{6}}{2}\right)$$
$$\left(\frac{\sqrt{30}}{2}, -\frac{\sqrt{6}}{2}\right)$$
$$\left(-\frac{\sqrt{30}}{2}, \frac{\sqrt{6}}{2}\right)$$
$$\left(-\frac{\sqrt{30}}{2}, -\frac{\sqrt{6}}{2}\right)$$



Ch 3 Review

3.4 - Using the Quadratic Formula

Warmup -

Find the quadratic that has integer coefficients and these solutions.

$$x = \frac{-1 \pm \sqrt{17}}{5}$$

$$y = 25x^2 + 10x - 16$$

3.1 - Solving Quadratic Equations

Practice - solve for x

1) $\frac{1}{x+1} + \frac{1}{x-1} = 1$

$x = 1 \pm \sqrt{2}$

2) $\frac{1}{x+2} + \frac{1}{x+6} = 1$

$x = -3 \pm \sqrt{5}$

3.1 - Solving Quadratic Equations

Practice - solve for x

1) $\sqrt{x+3} = 2x$

$x = 1$

-3/4 is extraneous!!!

2) $\sqrt{x-4} - \dfrac{2}{\sqrt{x-4}} = 1$

$x = 8$

5 is extraneous!!!

3.1 - Solving Quadratic Equations

Practice - solve for x

1) $\dfrac{x+1}{x^2+6x+8}+\dfrac{1}{x+2}=1$ $x=\{-3,-1\}$

2) $\dfrac{2}{x-4}-\dfrac{6}{x^2-5x+4}=\dfrac{x}{x-1}$ $x=\{2\}$ **4 is extraneous!!!**