

# 1.1 - Systems of Equations

Solve the following systems algebraically HMM.. or just use graphing calc!!

$$\begin{aligned} 1. \quad & -10x - 15y = 25 \\ & (x - 5y = -9) \cdot 3 \\ + & -3x + 15y = 27 \\ \hline & -13x = 52 \\ & x = -4 \end{aligned}$$

$(-4) - 5y = -9$   
 $-5y = -5$   
 $y = 1$

$(-4, 1)$

$$\begin{aligned} 2. \quad & y = \frac{1}{3}x + 3 \\ & y = 2x - 2 \end{aligned}$$

Graphed...

$(3, 4)$

$$\begin{aligned} 3. \quad & 25x - 9y = 3 \\ & (8x - 3y = 1) \cdot 3 \\ + & -24x + 9y = -3 \\ \hline & x = 0 \\ & y = -\frac{1}{3} \end{aligned}$$

$(0, -\frac{1}{3})$

$$\begin{aligned} 4. \quad & x^2 + 4y^2 = 36 \\ & -(x^2 + y^2 = 12) \\ \hline & 3y^2 = 24 \\ & y^2 = 8 \\ & y = \pm 2\sqrt{2} \end{aligned}$$

4 intersections!

$(2, 2\sqrt{2}) \quad (-2, 2\sqrt{2}) \quad (2, -2\sqrt{2}) \quad (-2, -2\sqrt{2})$

$x^2 + (2\sqrt{2})^2 = 12$  or  $x^2 + (-2\sqrt{2})^2 = 12$   
 $x^2 + 8 = 12$  Same as  
 $x^2 = 4$   
 $x = \pm 2$

## Application

5. Matt and Ming are selling fruit for a school fundraiser. Customers can buy small boxes of oranges and large boxes of oranges. Matt sold 3 small boxes of oranges and 14 large boxes of oranges for a total of \$203. Ming sold 11 small boxes of oranges and 11 large boxes of oranges for a total of \$220. Find the cost of one small box and one large box of oranges.

S = small box       $3S + 14L = 203$   
 L = large box       $11S + 11L = 220$

can use calc...  
Solve for L (y)

$$L = \frac{-3}{14}S + \frac{203}{14}$$

Adjust window/zoom out or fit.

$$L = -S + \frac{220}{11}$$

$(7, 13)$   
 \$0.7 small  
 \$13 Large

6. The senior classes at RHS and WFHS planned separate trips to New York City. The senior class at RHS rented and filled 1 van and 6 buses with 372 students. WFHS rented and filled 4 vans and 12 buses with 780 students. Each van and each bus carried the same number of students. How many students can a van carry? How many students can a bus carry?

$v = \text{van}$   
 $b = \text{bus}$

$$\begin{aligned} v + 6b &= 372 \\ 4v + 12b &= 780 \end{aligned}$$

$$\begin{aligned} b &= \frac{-v + 372}{6} \\ b &= \frac{-4v + 780}{12} \end{aligned}$$

Zoom fit here fails, since intersection isn't on screen. Gotta see it to find it!

Solve using graphing calculator. Sketch the graph and record the solution.

$v = 18$  students in a van  
 $b = 59$  students on a bus

$$\begin{aligned} 7. \quad & f(x) = -|x+3| + 6 \quad (1) \\ & f(x) = |x-4| + 4 \quad (2) \end{aligned}$$

$$\begin{aligned} 8. \quad & 3y + 12 = 2x \quad (1) \quad y = \frac{2x-12}{3} \\ & -2y = (x-5)^2 - 4 \quad (2) \quad y = \frac{(x-5)^2 - 4}{-2} \end{aligned}$$

