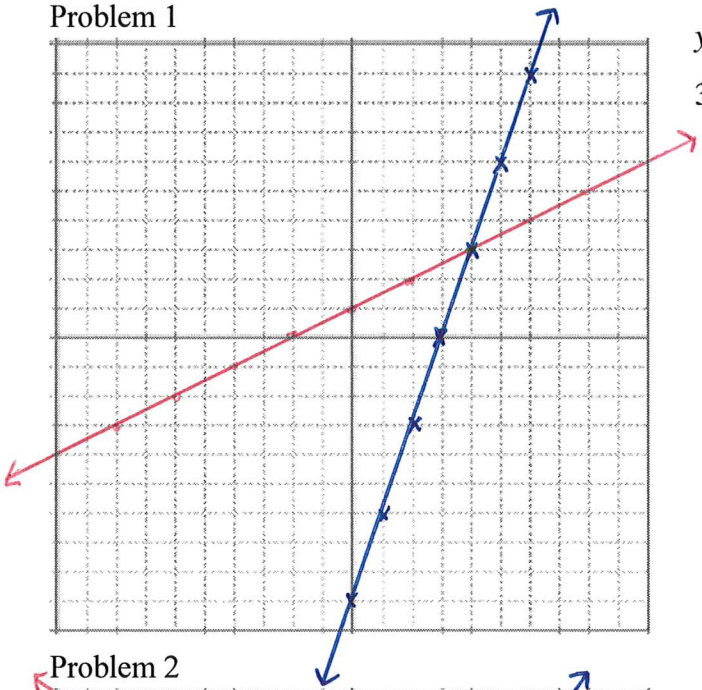
Graph each equation to find the point of intersection. P Name KEY (PRACTICE)

Remember to find a **nice starting point**, then use **the slope** to find other nice points.

Problem 1

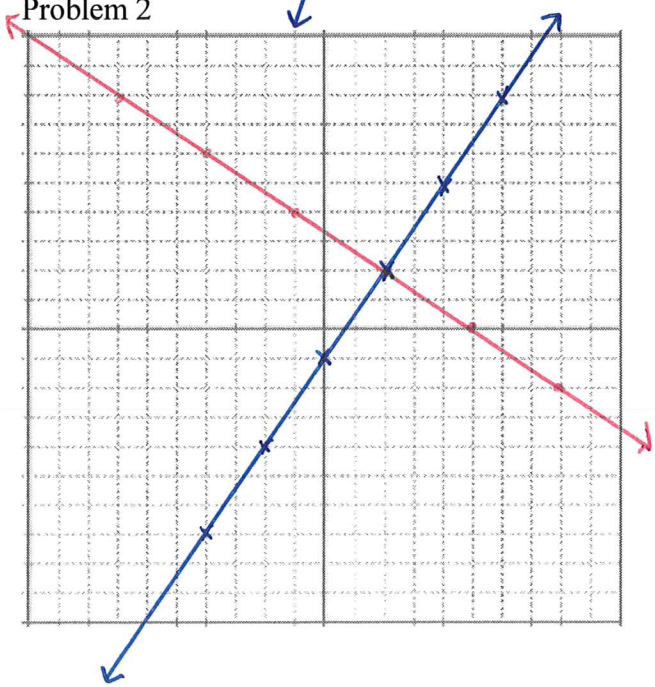


$y = \frac{1}{2}x + 1$ → m = 1/2 (0, 1)

$3x - y = 9$ → m = 3/1 (3, 0)

Pt of Intersection (4, 3)

Problem 2

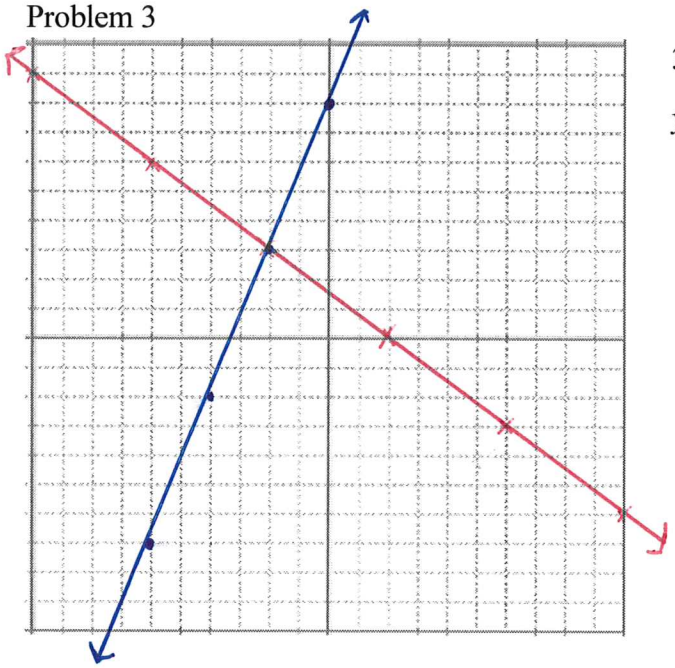


$2x + 3y = 10$ → m = −2/3 (5, 0)

$y = \frac{3}{2}x - 1$ → m = 3/2 (0, −1)

Pt of Intersection (2, 2)

Problem 3

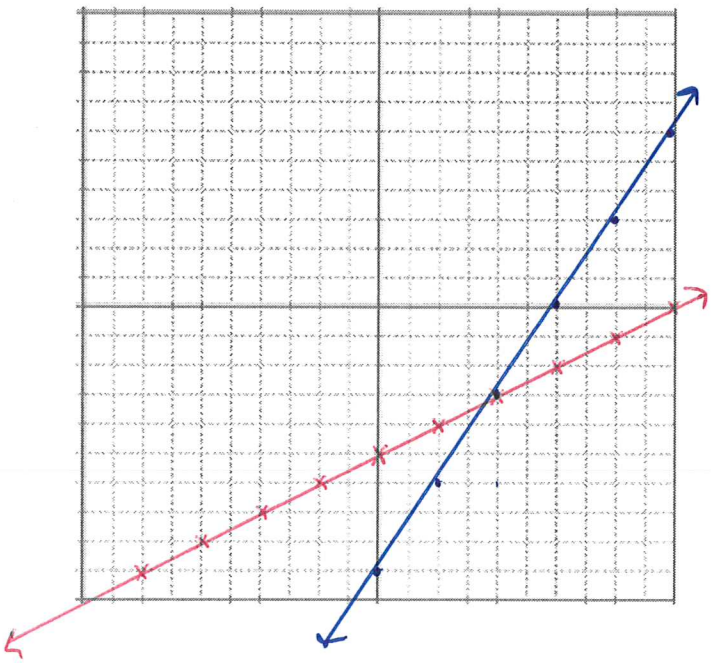


$3x + 4y = 6$ → $m = -3/4$ $(2,0)$

$y = \frac{5}{2}x + 8$ → $m = 5/2$ $(0,8)$

Pt of Intersection $(-2, 3)$

Problem 4

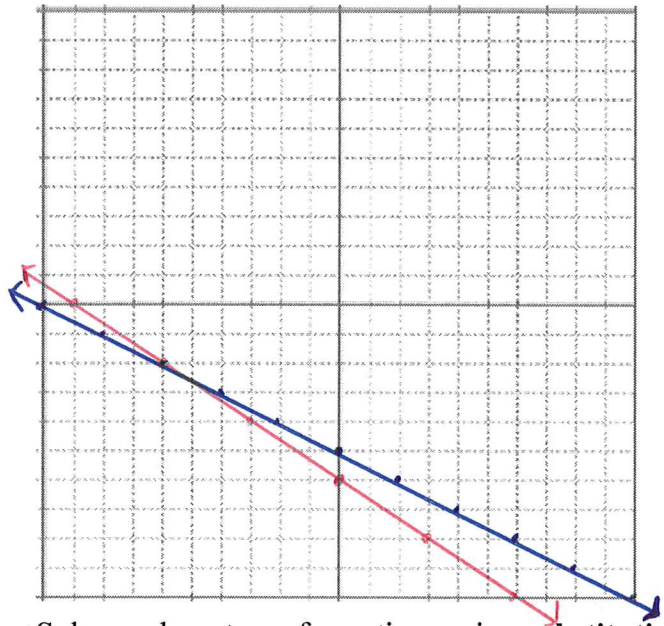


$y = \frac{1}{2}x - 5$ → $m = 1/2$ $(0,-5)$

$3x - 2y = 18$ → $m = 3/2$ $(6,0)$

Pt of Intersection $(4, -3)$

Problem 5



$y = \frac{-2}{3}x - 6$ → $m = -2/3$ $(0,-6)$

$x + 2y = -10$ → $m = -1/2$ $(0,-5)$

Pt of Intersection $(-6,-2)$

Solve each system of equations using **substitution.**

Problem 6

e_1: $2x - 3y = -4$

e_2: $x + 3y = 7$

e_2: $x = -3y + 7$

e_1: $2[-3y+7] - 3y = -4$

$-6y + 14 - 3y = -4$

$\frac{-9y}{-9} = \frac{-18}{-9}$

$y = 2$

$x = -3[2] + 7$

$x = -6 + 7$

$x = 1$

Pt of Intersection $(1,2)$

Problem 7

e_1: $x - 3y = 5$

e_2: $3x + 2y = 4$

e_1: $x = 3y + 5$

e_2: $3[3y+5] + 2y = 4$

$9y + 15 + 2y = 4$

$11y = -11$

$y = -1$

$x = 3[-1] + 5$

$x = 2$

Pt of Intersection $(2,-1)$

Problem 8

e_1: $5x + y = 4$

e_2: $x - 2y = 3$

e_2: $x = 2y + 3$

e_1: $5[2y+3] + y = 4$

$10y + 15 + y = 4$

$11y = -11$

$y = -1$

$x = 2[-1] + 3$

$x = 1$

Pt of Intersection $(1,-1)$

Problem 9

e_1: $x - 5y = -2$

e_2: $2x + 5y = -4$

e_1: $x = 5y - 2$

e_2: $2[5y-2] + 5y = -4$

$10y - 4 + 5y = -4$

$15y = 0$

$y = 0$

$x = 5[0] - 2$

$x = -2$

Pt of Intersection $(-2,0)$

Solve each system of equations using **substitution.**

Problem 10

e_1: $-2x + y = 1$

e_2: $4x + 3y = 23$

e_1: $y = 2x+1$

e_2: $4x+3[2x+1] = 23$

$4x + 6x+3 = 23$

$10x = 20$

$x = 2$

$y = 2[2]+1$

$y = 5$

Pt of Intersection $(2, 5)$

Solve each system of equations using **Linear Combination / Elimination.**

Problem 11

e_1: $5x - y = -6$

e_2: $x - y = -2$

e_1: $5x-y=-6$

$-1e_2$: $-x+y = 2$

$4x = -4$

$x = -1$

$-1 - y = -2$

$-y = -1$

$y = 1$

Pt of Intersection $(-1, 1)$

Problem 12

e_1: $x + 4y = 30$

$2e_2$: $4x - 2y = -12$

e_1: $x+4y = 30$

$4e_2$: $8x-4y = -24$

$9x = 6$

$x = 2/3$

$\frac{2}{3} + 4y = 30$

$4y = 29\frac{1}{3}$

$y = 7\frac{1}{3}$

Pt of Intersection $(2/3, 7\frac{1}{3})$

Problem 13

e_1: $x - y = 3$

e_2: $5x + y = -15$

e_1: $x-y = 3$

e_2: $5x+y = -15$

$6x = -12$

$x = -2$

$-2 - y = 3$

$-y = 5$

$y = -5$

Pt of Intersection $(-2, -5)$

Problem 14

e_1: $x = 3y + 5$

e_2: $2y + 3x = 4$

$2e_1$: $-6y + 2x = 10$

$3e_2$: $6y + 9x = 12$

$11x = 22$

$x = 2$

e_1: $-3y + x = 5$

e_2: $2y + 3x = 4$

$2y + 3[2] = 4$

$2y + 6 = 4$

$2y = -2$

$y = -1$

Pt of Intersection $(2, -1)$

Problem 15

e_1: $y = 3x - 1$

e_2: $x + y = 3$

e_1: $-3x+y = -1$

$-1e_2$: $-x-y = -3$

$-4x = -4$

$x = +1$

$1 + y = 3$

$y = 2$

Pt of Intersection $(1, 2)$

Solve each system of equations using **Cramer's Rule.**

Problem 16

e_1: $y = -x + 2$

e_2: $2x - y = 1$

$$x = \frac{\begin{vmatrix} c & y \\ 2 & 1 \\ 1 & -1 \end{vmatrix}}{\begin{vmatrix} x & y \\ 1 & 1 \\ 2 & -1 \end{vmatrix}} = \frac{-2-1}{-1-2} = \frac{-3}{-3} = 1$$

e_1: $x + y = 2$

e_2: $2x - y = 1$

$$y = \frac{\begin{vmatrix} x & c \\ 1 & 2 \\ 2 & 1 \end{vmatrix}}{-3} = \frac{1-4}{-3} = \frac{-3}{-3} = 1$$

Pt of Intersection $(1, 1)$

Problem 17

$x - y = 2$

$3y + 2x = 9$

$$x = \frac{\begin{vmatrix} c & y \\ 2 & -1 \\ 9 & 3 \end{vmatrix}}{\begin{vmatrix} x & y \\ 1 & -1 \\ 2 & 3 \end{vmatrix}} = \frac{6-(-9)}{3-(-2)} = \frac{15}{5} = 3$$

Pt of Intersection $(3, 1)$

e_1: $x - y = 2$

e_2: $2x + 3y = 9$

$$y = \frac{\begin{vmatrix} x & c \\ 1 & 2 \\ 2 & 9 \end{vmatrix}}{5} = \frac{9-4}{5} = \frac{5}{5} = 1$$

Problem 18

e_1: $y = x - 4$

e_2: $2x - 5y = 2$

$$x = \frac{\begin{vmatrix} c & y \\ -4 & 1 \\ 2 & -5 \end{vmatrix}}{\begin{vmatrix} x & y \\ -1 & 1 \\ 2 & -5 \end{vmatrix}} = \frac{20-2}{5-2} = \frac{18}{3} = 6$$

Pt of Intersection $(6, 2)$

e_1: $-x + y = -4$

e_2: $2x - 5y = 2$

$$y = \frac{\begin{vmatrix} x & c \\ -1 & -4 \\ 2 & 2 \end{vmatrix}}{3} = \frac{-2-(-8)}{3} = \frac{6}{3} = 2$$

Problem 19

e_1: $2x + 3y = 8$

e_2: $3x + y = 5$

$$x = \frac{\begin{vmatrix} c & y \\ 8 & 3 \\ 5 & 1 \end{vmatrix}}{\begin{vmatrix} x & y \\ 2 & 3 \\ 3 & 1 \end{vmatrix}} = \frac{8-15}{2-9} = \frac{-7}{-7} = 1$$

$$y = \frac{\begin{vmatrix} x & c \\ 2 & 8 \\ 3 & 5 \end{vmatrix}}{-7} = \frac{10-24}{-7} = \frac{-14}{-7} = 2$$

Pt of Intersection $(1, 2)$

Problem 20

$2x + 3y = 6$

$x + 2y = 1$

$$x = \frac{\begin{vmatrix} c & y \\ 6 & 3 \\ 1 & 2 \end{vmatrix}}{\begin{vmatrix} x & y \\ 2 & 3 \\ 1 & 2 \end{vmatrix}} = \frac{12-3}{4-3} = \frac{9}{1} = 9$$

$$y = \frac{\begin{vmatrix} x & c \\ 2 & 6 \\ 1 & 1 \end{vmatrix}}{1} = \frac{2-6}{1} = -4$$

Pt of Intersection $(9, -4)$

Solve each system with the **method of your choosing**.

Problem 21

e_1: $y = 3x + 5$

e_2: $x + 2y = 1$

e_2: $x + 2[3x+5] = 1$

$x + 6x + 10 = 1$

$7x = -9$

$x = -9/7$

$x = -1\,2/7$

$y = 3[-9/7] + 5$

$y = 1\,1/7$

Pt of Intersection $(-1\,2/7,\ 1\,1/7)$

Problem 22

e_1: $2x - 3y = 9$

e_2: $5x + 2y = -4$

$2e_1$: $4x - 6y = 18$

$3e_2$: $15x + 6y = -12$

$\frac{19x}{19} = \frac{6}{19}$

$x = 6/19$

$2(6/19) - 3y = 9$

$-3y = 159/19$

$y = -2\,15/19$

Pt of Intersection $(6/19,\ -2\,15/19)$

Problem 23

e_1 $4x - 5y = 10$

e_2 $3x + y = 9$

e_1: $4x - 5y = 10$

$5e_2$: $15x + 5y = 45$

$19x = 55$

$x = 2\,17/19$

$3[2\,17/19] + y = 9$

$y = 6/19$

Pt of Intersection $(2\,17/19,\ 6/19)$

Problem 24

e_1: $6x + 3y = 5$

e_2: $x + 4y = 9$

e_2: $x = 9 - 4y$

e_1: $6[9-4y] + 3y = 5$

$54 - 24y + 3y = 5$

$-21y = -49$

$y = 2\,1/3$

$x = 9 - 4(2\,1/3)$

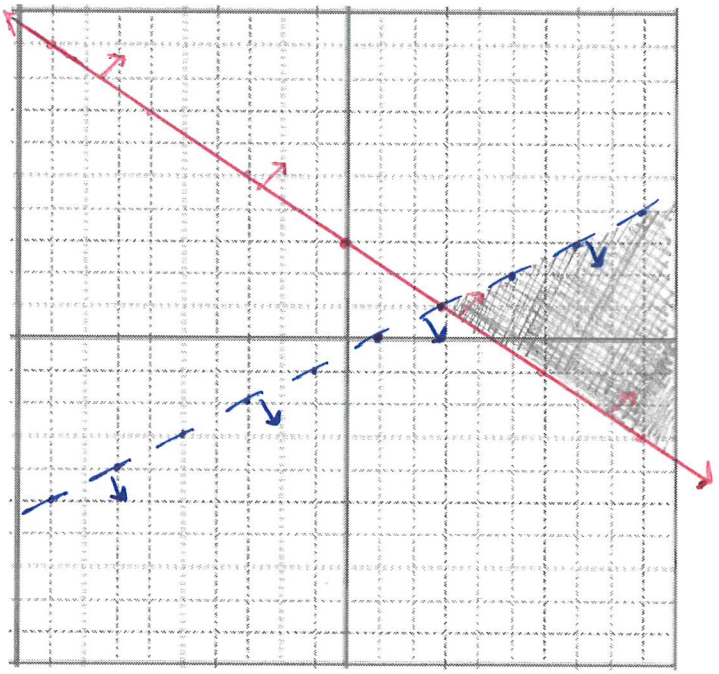
$x = -1/3$

Pt of Intersection $(-1/3,\ 2\,1/3)$

Graph The System of Inequalities

#25. $y \geq \frac{-2}{3}x + 3$ → m = -2/3 (0, 3)

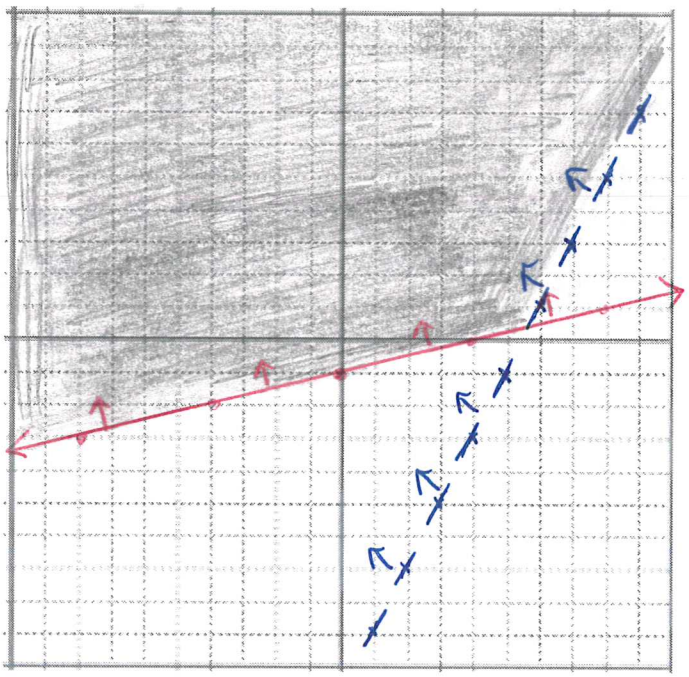
$x - 2y > 1$ → m = 1/2 (1, 0)



#26. $y \geq \frac{1}{4}x - 1$ → m = 1/4 (0, -1)

$2x - y < 11$ → m = 2/1 (4, -3)

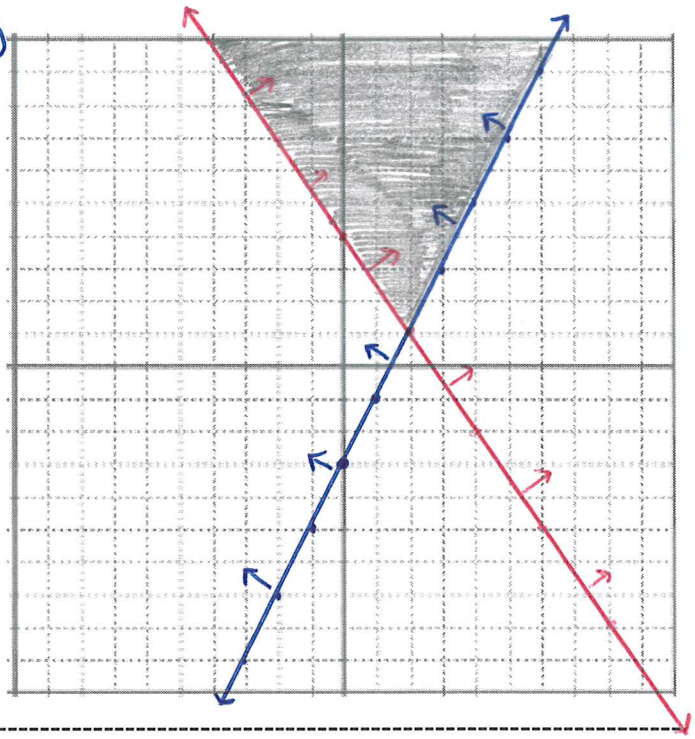
8 + 3 = 11



Graph The System of Inequalities

#27. $3x+2y \geq 8$ → m = -3/2 (0, 4)

$2x-y \leq 3$ ↳ m = 2/1 (0, -3)



#28. $y \leq \frac{2}{5}x-6$ → m = 2/5 (0, -6)

$3x+2y<7$ → m = -3/2

3 + 4 (1, 2)