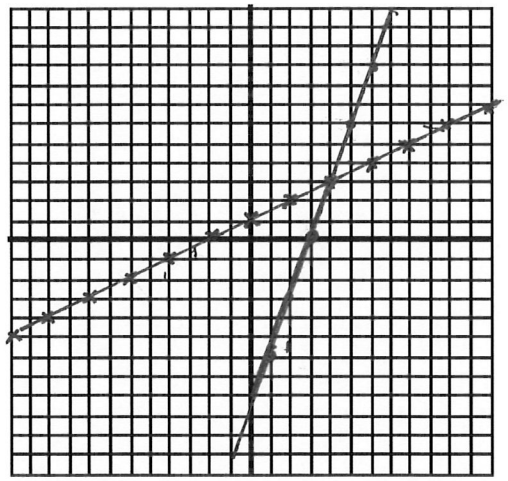
Graph each equation to find the point of intersection. P Name KEY

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

Problem 1

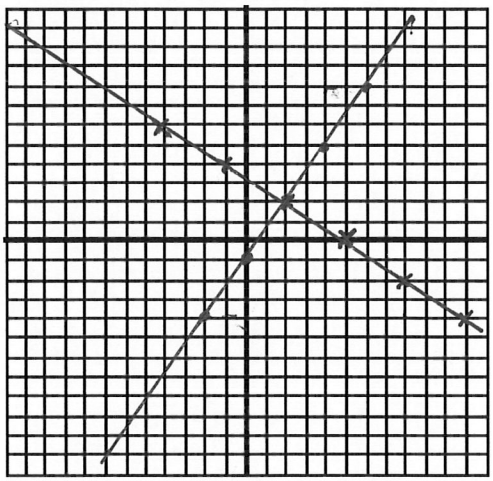


$y = \frac{1}{2}x + 1$ → $m = 1/2$, (0,1)

$3x - y = 9$ → $m = 3/1$, (3,0)

Pt of Intersection (4,3)

Problem 2

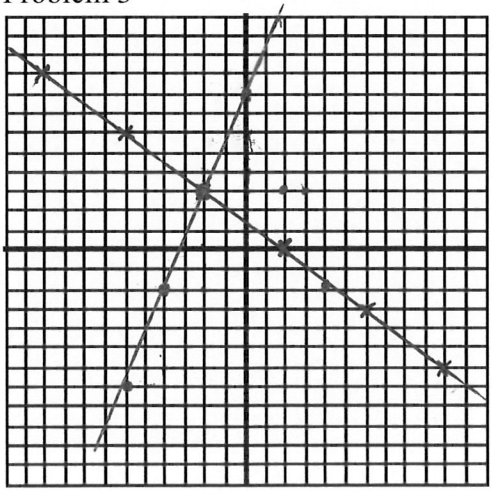


$2x + 3y = 10$ → $m = \frac{-2}{3}$, (5,0)

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

Pt of Intersection (2,2)

Problem 3

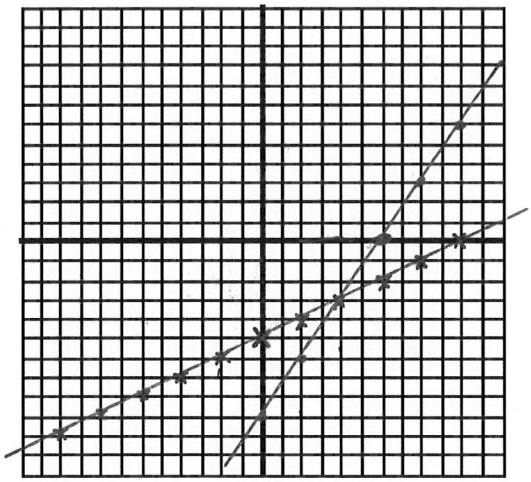


$3x + 4y = 6$ → $m = \frac{-3}{4}$, (2,0)

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

Pt of Intersection (-2,3)

Problem 4

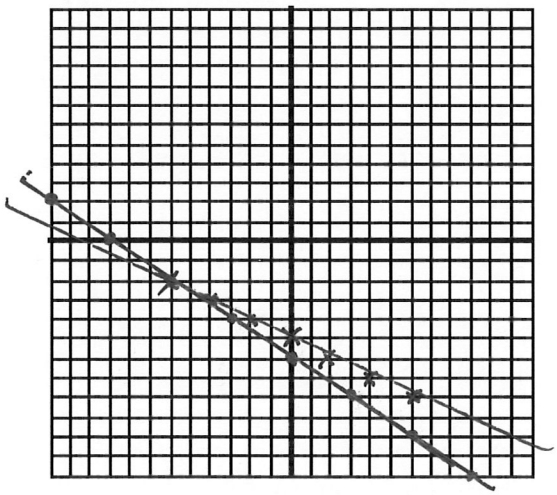


$y = \frac{1}{2}x - 5$ → $m = 1/2$, $(0,-5)$

$3x - 2y = 18$ → $m = \frac{3}{2}$, $(6,0)$

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

2x - 3y = -4

x +3y = 7

$x = 7 - 3y$

$2[7-3y] - 3y = -4$

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

$-9y = -4 - 14$

$-9y = -18$

$y = 2$

$x = 7 - 3(2)$

$= 1$

Pt of Intersection $(1,2)$

Problem 7

x - 3y = 5

3x + 2y = 4

$x = 5 + 3y$

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

$15 + 9y + 2y = 4$

$11y = 4 - 15$

$\frac{11y}{11} = \frac{-11}{11}$

$y = -1$

$x = 5 + 3(-1)$

$x = 2$

Pt of Intersection $(2,-1)$

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

Problem 8

$5x + y = 4$
$x - 2y = 3$

$x = 3 + 2y$

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

$15 + 10y + y = 4$

$15 + 11y = 4$

$11y = 4 - 15$

$11y = -11$

$y = -1$

$x = 3 + 2(-1)$

$= 1$

Pt of Intersection $(1, -1)$

Problem 9

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

$x = -2 + 5y$

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

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

$-4 + 15y = -4$

$15y = 0$

$y = 0$

$x = -2 + 5(0)$

$x = -2$

Pt of Intersection $(-2, 0)$

Problem 10

$-2x + y = 1$
$4x + 3y = 23$

$y = 2x + 1$

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

$4x + 6x + 3 = 23$

$10x = 20$

$x = 2$

$y = 2(2) + 1$

$y = 5$

Pt of Intersection $(2, 5)$

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

Problem 11

$5x - y = -6$
$x - y = -2$ $\times -1$

$-1 - y = -2$

$-y = -1$

$y = 1$

$5x - y = -6$

$-x + y = 2$

$4x = -4$

$x = -1$

Pt of Intersection $(-1, 1)$

Problem 12

$2x + 8y = 60$ $\div 2$
$2x - y = 6$

$x + 4(7\frac{1}{3}) = 30$

$x = 30 - 4(7\frac{1}{3})$

$x = \frac{2}{3}$

$-2x - 8y = -60$

$2x - y = -6$

$\frac{-9y}{-9} = \frac{-66}{-9}$

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

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

Problem 13

$x - y = 3$
$5x + y = -15$

$5(-2) + y = -15$

$-10 + y = -15$

$y = -15 + 10$

$y = -5$

$x - y = 3$

$5x + y = -15$

$6x = -12$

$x = -2$

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

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

Problem 14
$x = 3y + 5$
$2y + 3x = 4$

$2[x - 3y = 5]$ $\quad x = 2$
$3[3x + 2y = 4]$

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

$2x - 6y = 10$
$9x + 6y = 12$
$11x = 22$
$\frac{11x}{11} = \frac{22}{11}$

Pt of Intersection $(2, -1)$

Problem 15
$y = 3x - 1$
$x + y = 3$

$-1[-3x + y = -1]$
$x + y = 3$

$3x - y = 1$
$x + y = 3$
$4x = 4$
$x = 1$

$1 + y = 3$
$y = 2$

Pt of Intersection $(1, 2)$

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

Problem 16
$y = -x + 2$
$2x - y = 1$

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

$x = \frac{\begin{vmatrix} C & Y \\ 2 & 1 \\ 1 & -1 \end{vmatrix}}{\begin{vmatrix} X & Y \\ 1 & 1 \\ 2 & -1 \end{vmatrix}} = \frac{-2-1}{-1-2} = \frac{-3}{-3} = 1$

$y = -1 + 2$
$y = 1$

Pt of Intersection $(1, 1)$

Problem 17
$x - y = 2$
$3y + 2x = 9$

$x - y = 2$
$2x + 3y = 9$

$x = \frac{\begin{vmatrix} C & Y \\ 2 & -1 \\ 9 & 3 \end{vmatrix}}{\begin{vmatrix} X & Y \\ 1 & -1 \\ 2 & 3 \end{vmatrix}} = \frac{6 - -9}{3 - -2} = \frac{15}{5} = 3$

$3 - y = 2$
$-y = 2 - 3$
$-y = -1$
$y = 1$

Pt of Intersection $(3, 1)$

Problem 18
$y = x - 4$
$2x - 5y = 2$

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

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

$y = 6 - 4$
$y = 2$

Pt of Intersection $(6, 2)$

Problem 19
$2x + 3y = 8$
$3x + y = 5$

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

$2 + 3y = 8$
$3y = 6$
$y = 2$

Pt of Intersection $(1, 2)$

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

Problem 20
$2x + 3y = 6$
$x + 2y = 1$

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

$9 + 2y = 1$
$2y = -8$
$y = -4$

Pt of Intersection $(9, -4)$

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

Problem 21
$y = 3x + 5$
$x + 2y = 1$

$x + 2[3x + 5] = 1$
$x + 6x + 10 = 1$
$7x + 10 = 1$
$7x = -9$
$x = -1\frac{2}{7}$

$y = 3[-1\frac{2}{7}] + 5$
$y = 1\frac{1}{7}$

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

Problem 22
$2[2x - 3y = 9]$
$3[5x + 2y = -4]$

$4x - 6y = 18$
$15x + 6y = -12$
$19x = 6$
$x = \frac{6}{19}$

$2(\frac{6}{19}) - 3y = 9$
$-3y = 9 - 2(\frac{6}{19})$
$y = -2\frac{15}{19}$

Pt of Intersection $(\frac{6}{19}, -2\frac{15}{19})$

Problem 23
$4x - 5y = 10$
$3x + y = 9$

$4x - 5[-3x + 9] = 10$
$4x + 15x - 45 = 10$
$\frac{19x}{19} = \frac{55}{19}$
$x = 2\frac{17}{19}$

$y = -3x + 9$
$y = -3(2\frac{17}{19}) + 9$
$y = \frac{6}{19}$

Pt of Intersection $(2\frac{17}{19}, \frac{6}{19})$

Problem 24
$-4[6x + 3y = 5]$
$3[x + 4y = 9]$

$-24x - 12y = -20$
$3x + 12y = 27$
$\frac{-21x}{-21} = \frac{7}{-21}$
$x = -\frac{1}{3}$

$-\frac{1}{3} + 4y = 9$
$4y = 9\frac{1}{3}$
$y = 2\frac{1}{3}$

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