

Tenth Set of Homework for Math 05

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Please note: You should fully justify your answers.

1 Finding intersection points of lines

1. For each of the following pair of equations find the points of intersection:

(a) $x = 5, y = -3$ $(5, -3)$

(b) $2x + 3y = 12, x = -3$ $(-3, 6)$

(c) $5x - 12y = 6, y = -2$ $(6, 2)$

(d) $y = 3x - 1, 6x - 2y = 11$ **No intersection point.**

(e) $-3x + 5y = 11, x = 5y - 14$ $\left(-3, \frac{11}{5}\right)$

(f) $2x - y = 4, y = -3x - 9$ $(-1, -6)$

(g) $4x - 3y = -14, y = 2x + 5$ $\left(-\frac{1}{2}, 4\right)$

(h) $y = x + 1, 2x - 2y = -2$ **The same line. All solutions to $y = x + 1$.**

(i) $y = 2x + 3, y = 5x + 6$ $(-1, 1)$

2. Find the coordinates of the point of intersection for each of the pairs of lines shown in Figure 1.

3. The points $A(7, -1)$, $B(3, 3)$, $C(5, 7)$, and D are the corners of a parallelogram. Find the coordinates of the point D . $(9, 3)$

2 Solving Systems of linear equations

1. Solve the following systems.

(a) $\begin{cases} x + y = 10 \\ x - y = 2 \end{cases}$ $(6, 4)$

(b) $\begin{cases} 2x + 5y = 19 \\ -2x + 9y = 23 \end{cases}$ $(2, 3)$

(c) $\begin{cases} 3x - 4y = -27 \\ 3x + 2y = -9 \end{cases}$ $(-5, 3)$

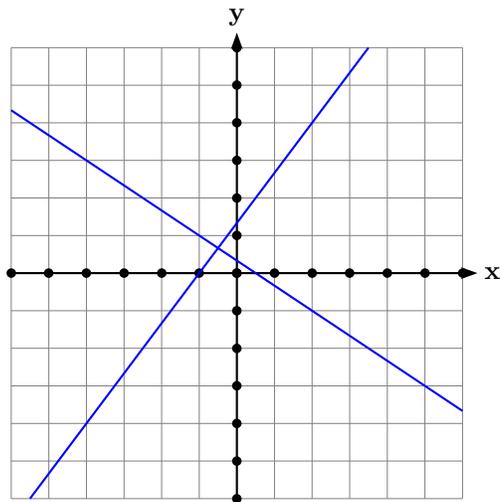
(d) $\begin{cases} 2x + y = 6 \\ 5x - 3y = 26 \end{cases}$ $(4, -2)$

(e) $\begin{cases} 6x + 7y = -33 \\ 3x - 5y = 9 \end{cases}$ $(-2, -3)$

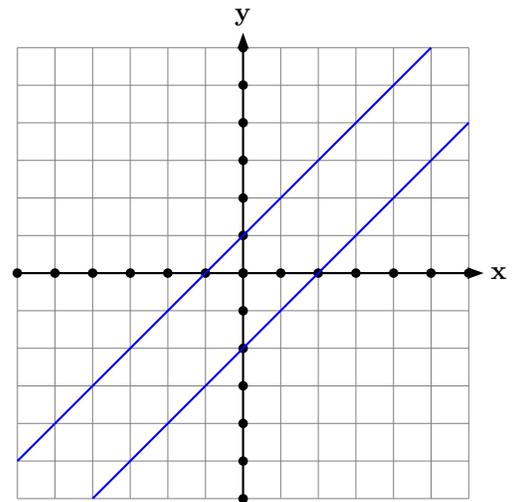
(f) $\begin{cases} 7x - 3y = 19 \\ -3x + 2y = -1 \end{cases}$ $(7, 10)$

(g) $\begin{cases} 2x - 3y = 7 \\ 4x - 6y = -10 \end{cases}$ **Inconsistent system.**

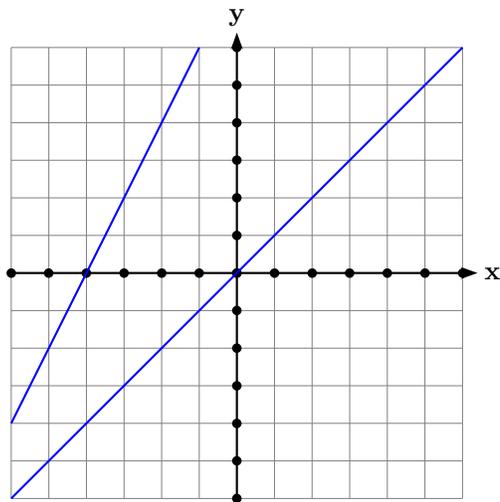
(h) $\begin{cases} -4x + 7y = 10 \\ 5x - 2y = -10 \end{cases}$ $\left(-\frac{50}{27}, \frac{10}{27}\right)$



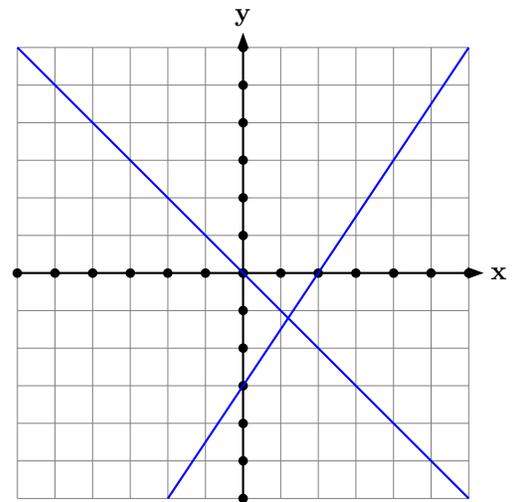
(a) $\left(-\frac{1}{2}, \frac{2}{3}\right)$



(b) No intersection.



(c) $(-8, -8)$



(d) $\left(\frac{5}{6}, -\frac{5}{6}\right)$

Figure 1: The lines of Question 2

$$(i) \begin{cases} 4x + 5y = 10 \\ 12x + 15y = 30 \end{cases} \text{ Indeterminate system.}$$

$$(j) \begin{cases} 5x + 4y = -5 \\ 2x - 7y = -45 \end{cases} \quad (-5, 5)$$

$$(k) \begin{cases} 3x - 6y = 10 \\ 2x - 8y = 25 \end{cases} \quad \left(-\frac{35}{6}, -\frac{55}{12}\right)$$

2. Can you solve the following system of three linear equations with three unknowns?

$$\begin{cases} 7x - 3y + 2z = -25 \\ -3x + 2y + 3z = 35 \\ x + y + z = 10 \end{cases}$$

$$x = -2, y = 7, z = 5$$