

## WRH 5 Solutions

$$2.2: 15, 24, 29, 41$$

$$2.3: 1, 28, 41, 46$$

$$2.4: 1, 20, 29, 37, 47, 54, 65$$

$$2.5: 1, 11, 24, 31, 41$$

$$2.6: 4, 22, 37, 52$$

2.2

15. Center:  $(0,0)$   
 $A(6,-7)$

$$(x-a)^2 + (y-b)^2 = r^2$$

$$a=0$$

$$b=0$$

$$x^2 + y^2 = r^2 \quad r=?$$

A:  $6^2 + (-7)^2 = r^2$

$$36 + 49 = r^2$$

$$r^2 = 85$$

Hence,

$$x^2 + y^2 = 85$$

24.

$$A(6,a)$$

$$B(4,a)$$

Center is a midpoint of a diameter.

$$C\left(\frac{4+6}{2}, \frac{9+9}{2}\right) = C(5, 9)$$

$$r = \frac{d}{2}$$

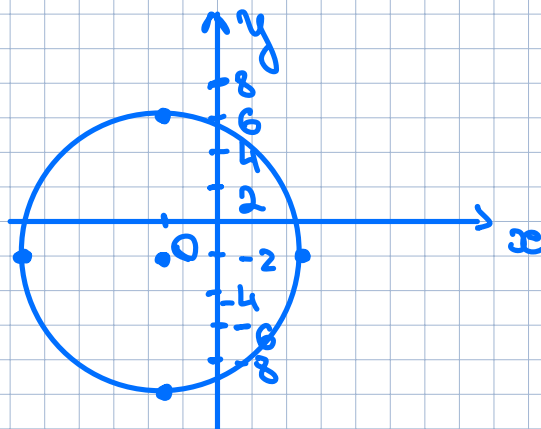
$$d = \sqrt{(4-6)^2 + (9-9)^2} = 2$$

$$r = \frac{2}{2} = 1$$

Therefore,

$$(x-5)^2 + (y-9)^2 = 1$$

2a.



$$C(-3, -2)$$

$$r = 8$$

Therefore,

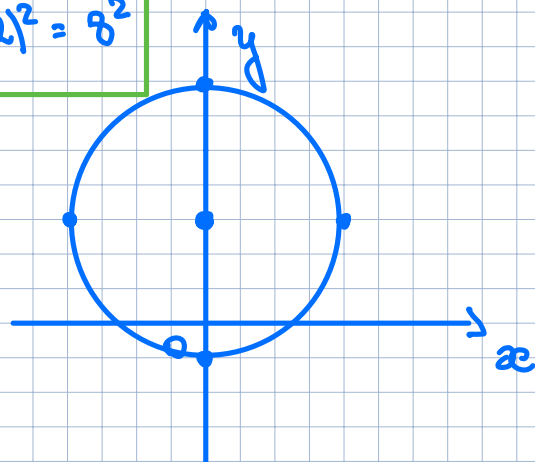
$$(x+3)^2 + (y+2)^2 = 8^2$$

3a.

$$x^2 + (y-3)^2 = 16$$

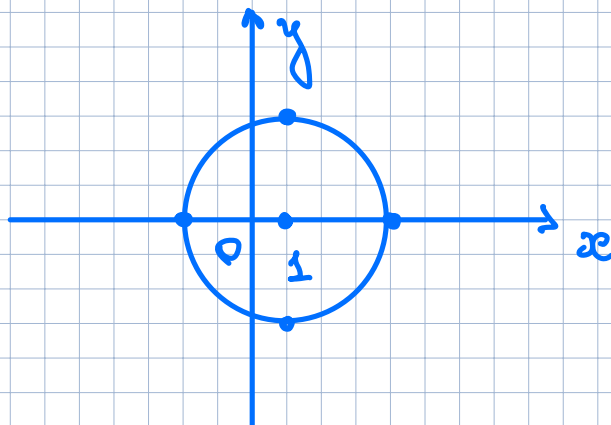
$$r = 4$$

$$C(0, 3)$$



51.  $(x-1)^2 + y^2 = 9$

$$\begin{aligned} r &= 3 \\ C &(1, 0) \end{aligned}$$



2.3

1.  $3x + 2(x-4y) = 2x - y$

$$3x + \cancel{2x} - 8y = \cancel{2x} - y$$

$$3x - 7y = 0$$



Linear

28.

$$y - 2x = y - 4$$

Y-intercepts:

$$x = 0 :$$

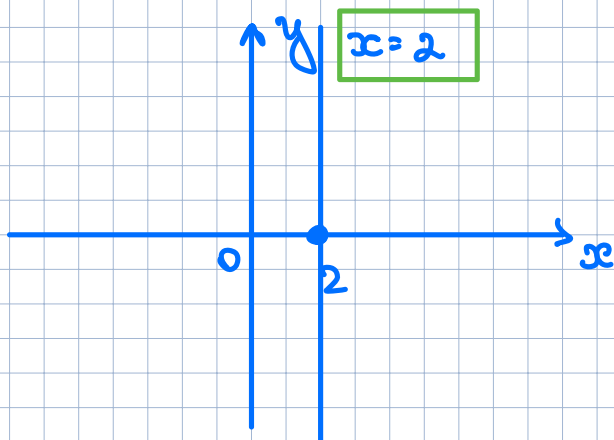
$$\cancel{y} = \cancel{y} - 4 \Rightarrow \emptyset$$

X-intercepts:

$$y = 0 :$$

$$-2x = -4 \Rightarrow x = 2$$

(2, 0)



41.  $2x + 3y = 4$

$$3y = 4 - 2x$$

$$y = \frac{4}{3} - \frac{2}{3}x \Rightarrow y = -\frac{2}{3}x + \frac{4}{3}$$

$$m = -\frac{2}{3} < 0$$

$$(0, \frac{4}{3}) - y\text{-intercept}$$

(e)

46.

$$ax + by = c$$

$$y = ?$$

$$by = c - ax$$

$$y = \frac{c}{b} - \frac{a}{b}x, \quad b \neq 0.$$

$$y = \frac{c - ax}{b}$$

2.4

1.  $\overset{x_1}{(0, \overset{y_1}{-3})} \quad \overset{x_2}{(-2, \overset{y_2}{5})}$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{5 + 3}{-2 - 0} = -4$$

20.  $\frac{x-y}{3} + 2 = 4$

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

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

$$y = -6 + x$$

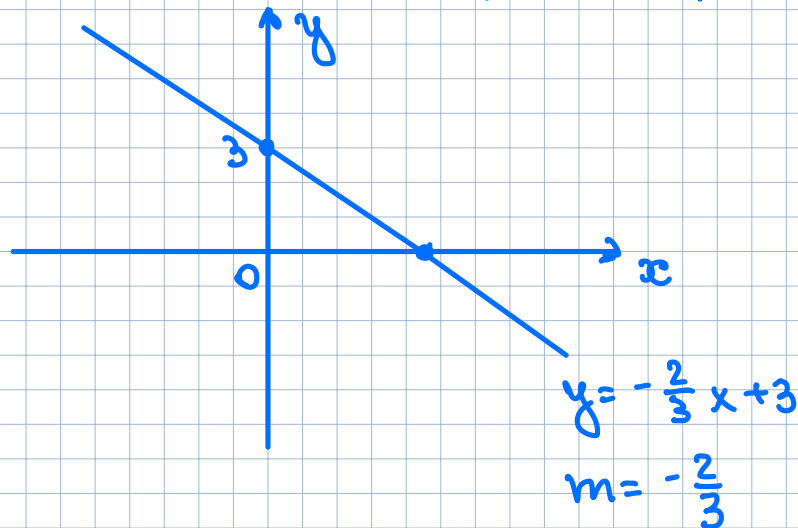
$$y = x - 6$$

$$m = 1$$

29.  $3y + 2x - 9 = 0$

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

$$y = -\frac{2}{3}x + 3 \quad \text{— slope-intercept form}$$



37. y-intercept  $(0, -3)$

$$m = \frac{3}{4}$$

$$y = mx + b \quad (0, b)$$

$$y = \frac{3}{4}x - 3$$

47.

$$A(3, -1)$$

$$m = 10$$

Standard form :  $ax + by = c$

$$y = \frac{c - ax}{b} = \frac{c}{b} - \frac{a}{b}x$$

$$m = 10 = -\frac{a}{b}$$

$$a = -10b$$

$$-1 = \frac{c}{b} - \frac{a}{b} \cdot 3$$

$$\frac{c}{b} = -1 - 30 = -31$$

$$y = -31 + 10x$$

$$10x - y = 31$$

54.  $(-9, 2) \quad (1, 5)$

$$ax + by = c$$

$$-9a + 2b = c$$

$$a + 5b = c$$

$$m = \frac{3}{10}$$

$$y = \frac{c}{b} - \frac{a}{b}x$$

$$-\frac{a}{b} = \frac{3}{10} \Rightarrow 10a = -3b$$

$$2 = \frac{c}{b} + \frac{3}{10} \cdot (-9)$$

$$\frac{c}{b} = 2 + \frac{27}{10} = \frac{47}{10}$$

Therefore,

$$y = \frac{47}{10} + \frac{3}{10}x$$

$$10y - 3x = 47$$

$$65. \quad -6y + 9 = \frac{x}{-2}$$

$$y = \frac{x}{12} + \frac{9}{6} = \frac{x}{12} + \frac{3}{2}$$

$$m = \frac{1}{12}$$

$$(0, b) = (0, \frac{3}{2})$$

(e)

2.5

$$1. \quad y - 4x = 7 \quad A(-1, 5)$$

$$y = 4x + 7$$

$$l_1: y = mx + b$$

$$l_2: m_1 = 4$$

$$l_1 \parallel l_2 \Rightarrow m_1 = m = 4$$

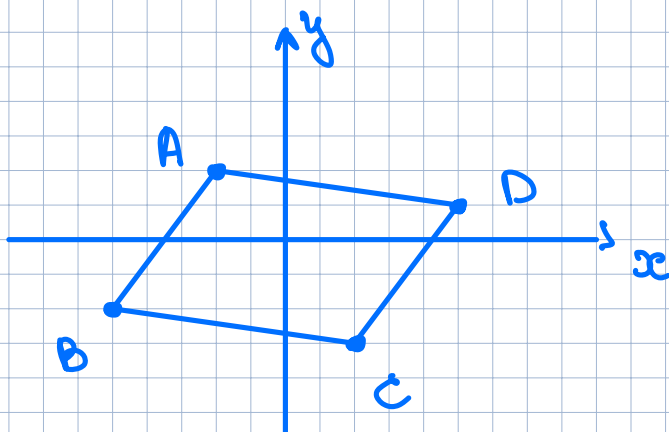
$$y = 4x + b$$



$$A: 5 = -4 + b \Rightarrow b = 9$$

$$y = 4x + 9$$

11.  $\{(-2, 2)^A, (-5, -2)^B, (2, -3)^C, (5, 1)^D\}$



$$AB \parallel CD$$

$$AD \parallel BC$$

ABCD is a parallelogram.

24.  $l_1: \frac{2x-3y}{3} = \frac{x-1}{6}$

$$m_1 = ?$$

$l_2: 2y - x = 3$

$$m_2 = ?$$

$$6(2x-3y) = 3(x-1)$$

$$12x - 18y = 3x - 3$$

$$-18y = -9x - 3$$

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

$$m_1 = \frac{1}{2}$$

$$2y = x + 3$$

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

$$m_2 = \frac{1}{2}$$

Hence,

$$m_1 = m_2 = \frac{1}{2}. \text{ Therefore, } l_1 \parallel l_2.$$

31.  $l_1: 3x + 2y = 3y - 7$       $A(3, -2)$

$$l_2: y = m_2 x + b \quad - ?$$

$$l_1: y = 3x + 7$$
$$m_1 = 3$$

$$l_1 \perp l_2 \quad \text{iff}$$

$$m_1 \cdot m_2 = -1$$

$$m_2 \cdot 3 = -1$$

$$m_2 = -\frac{1}{3}$$

$$l_2: y = -\frac{1}{3}x + b$$

$$A: -2 = -\frac{1}{3} \cdot 3 + b \Rightarrow b = -1$$

Therefore,

$l_2:$

$$y = -\frac{1}{3}x - 1$$

41.  $l_1: x - 5y = 2$

and  $l_2: 5x - y = 2$

$$y = \frac{1}{5}x - \frac{2}{5}$$

$$y = 5x - 2$$

$$m_1 = \frac{1}{5}$$

$$m_2 = 5$$

$$m_1 \cdot m_2 = 1 \neq -1$$

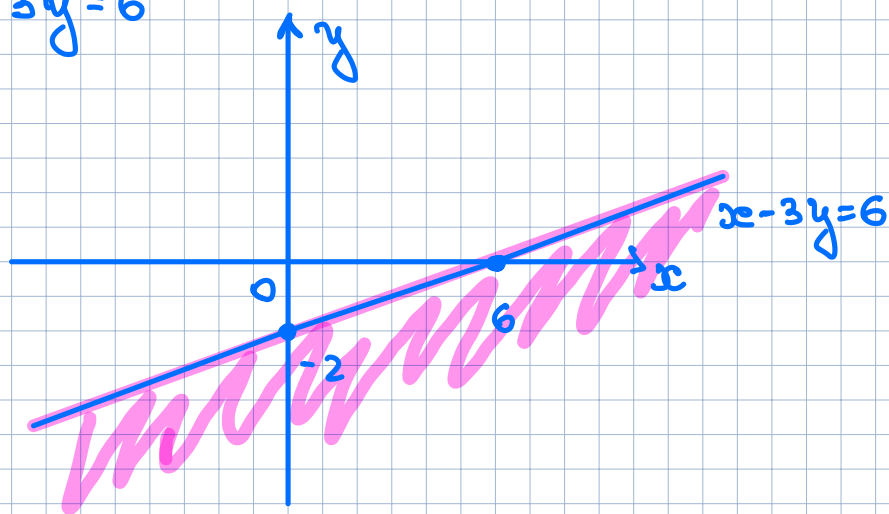
Therefore,

$$l_1 \neq l_2$$

2.6

4.  $x - 3y \geq 6$

$$x - 3y = 6$$



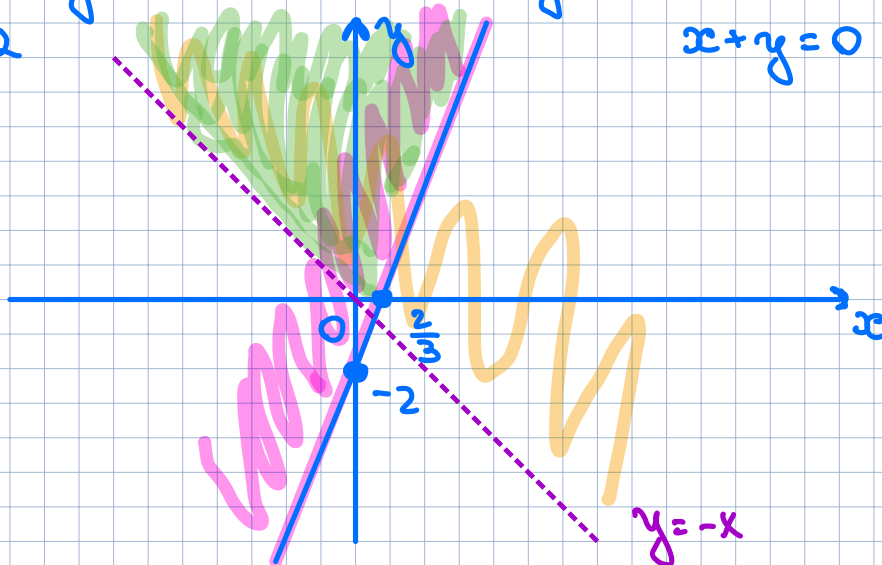
22.

$$3x - y \leq 2$$

$$3x - y = 2$$

and  $x + y > 0$

$$x + y = 0$$



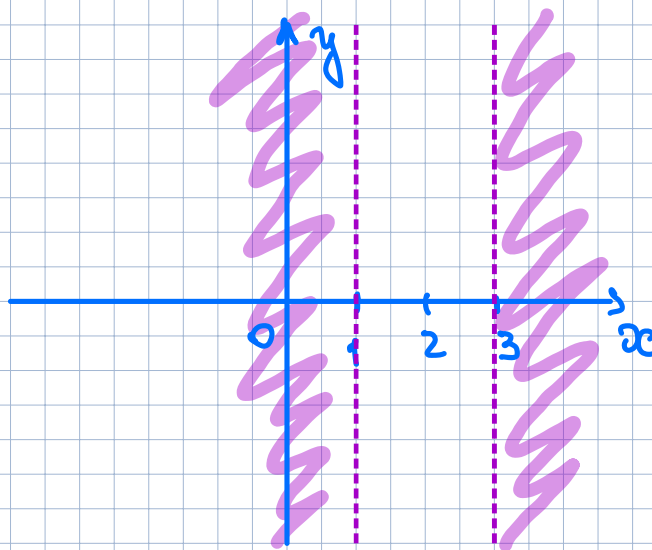
is a solution

37.  $|2x-4| > 2$

$$2 < 2x-4 < -2$$

$$6 < 2x < 2$$

$$3 < x < 1$$



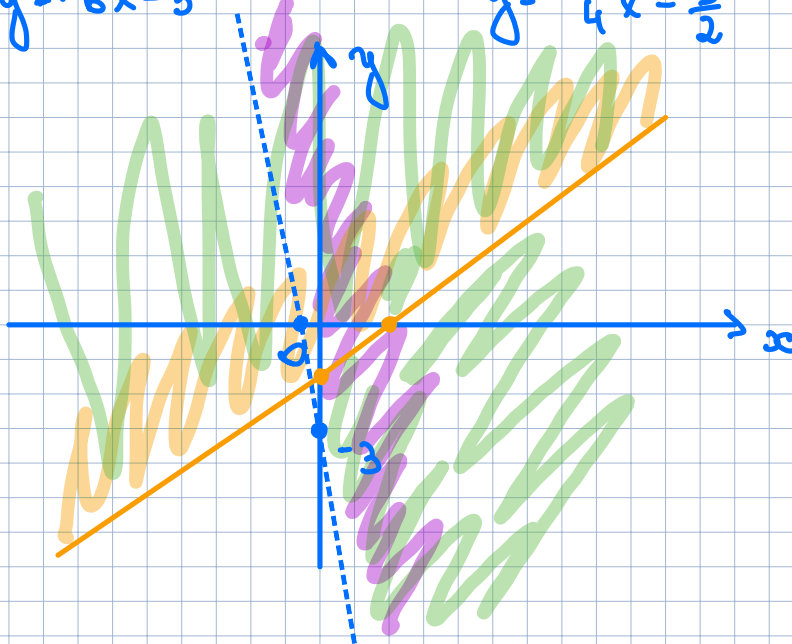
52.  $-y < 6x+3$  or  $4y \geq 3x-6$

$$y > -6x-3$$

$$y = -6x-3$$

$$y \geq \frac{3}{4}x - \frac{3}{2}$$

$$y = \frac{3}{4}x - \frac{3}{2}$$



(e)

2.2

41.  $x^2 + y^2 - 4x + 4y - 8 = 0$

$$(x^2 - 4x) + (y^2 + 4y) = 8$$

$$(x-2)^2 + (y+2)^2 = 16 = 4^2$$

Center :  $(2, -2)$

radius:  $r=4$

