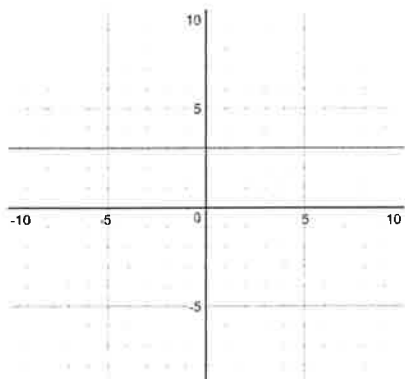


### Section 3.1b – Practice Problems

#### EMERGING LEVEL QUESTIONS

Determine the equation of the graph and explain why.

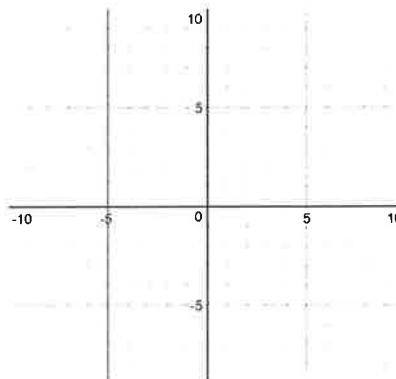
1.



Equation:  $y = 3$

Why: No slope, horizontal line

2.



Equation:  $x = -5$

Why: Vertical line, every x-value is -5

Determine the equation of a line through the given pair of points.

3.  $(-4, 1)$  and  $(6, 1)$

$$\frac{1-1}{6-(-4)} = \frac{0}{10} = 0 \quad \text{Horizontal}$$

$$y = 1$$

4.  $(1, -4)$  and  $(1, 6)$

$$\frac{6-(-4)}{1-1} = \frac{10}{0} \quad \text{undefined slope}$$

Vertical Line

$$x = 1$$

5.  $(-2, 0)$  and  $(5, 0)$

$$\frac{0-0}{5-(-2)} = \frac{0}{7} \quad m = 0$$

Horizontal

$$y = 0$$

6.  $(0, -2)$  and  $(0, 5)$

$$\frac{5-(-2)}{0-0} = \frac{7}{0}$$

m is undefined

Vertical line

$$x = 0$$

7.  $(a, b)$  and  $(c, b)$

$$\frac{b-b}{c-a} = \frac{0}{c-a} \quad \text{Horizontal}$$

$$y = b$$

8.  $(b, a)$  and  $(b, c)$

$$\frac{c-a}{b-b} = \frac{c-a}{0}$$

$$x = b$$

Write the equation of the line with the given information

9. vertical, passes through (3, 6)

$$x = 3$$

↑  
vertical through here

10. vertical, passes through (-2, -4)

$$x = -2$$

↑  
vertical through here

11. horizontal, passes through (3, 6)

$$y = 6$$

↑  
horizontal

12. horizontal, passes through (-2, -4)

$$y = -4$$

↑  
horizontal

Parallel: same slope

PROFICIENT LEVEL QUESTIONS

Perpendicular: negative reciprocal

For each pair of equations, determine whether they are parallel, perpendicular, or neither

13.  $2x + 5y = 7$  and  $4x + 10y = 2$   
 $-2x$     $-2x$

$$5y = -2x + 7$$

$$y = -\frac{2}{5}x + \frac{7}{5}$$

$$10y = -4x + 2$$

$$y = -\frac{4}{10}x + \frac{2}{10}$$

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

Same slope

$$\text{Parallel!}$$

14.  $-4x + 3y = 7$  and  $-8x + 6y = 0$   
 $+4x$     $+4x$

$$3y = 4x + 7$$

$$y = \frac{4}{3}x + \frac{7}{3}$$

$$6y = 8x$$

$$y = \frac{8}{6}x$$

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

Same slope

$$\text{Parallel}$$

15.  $4x - 3y = 6$  and  $4x + 6y = -3$   
 $-4x$     $-4x$     $-4x$     $-4x$

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

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

$$6y = -4x - 3$$

$$y = -\frac{4}{6}x - \frac{3}{6}$$

$$y = -\frac{2}{3}x - \frac{1}{2}$$

NOT SAME  
OR  
NEG RECIPROCAL

$$\text{NEITHER}$$

16.  $3x - 5y = 4$  and  $5x - 3y = 4$   
 $-3x$     $-3x$     $-5x$     $-5x$

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

$$y = \frac{3}{5}x - \frac{4}{5}$$

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

$$y = \frac{-5x + 4}{-3}$$

$$y = \frac{5}{3}x - \frac{4}{3}$$

$$\text{NEITHER}$$

17.  $4x - 3y = 5$  and  $3x + 4y = 2$   
 $-4x$        $-4x$        $-3x$        $-3x$

$-3y = -4x + 5$

$4y = -3x + 2$

$y = \left(\frac{4}{3}\right)x - \frac{5}{3}$

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

Neg reciprocals

Perpendicular

18.  $2x - 5y = -3$  and  $10x + 4y = 1$   
 $-2x$        $-2x$

$-5y = -2x - 3$

$4y = -10x + 1$

$y = \left(\frac{2}{5}\right)x + \frac{3}{5}$

$y = -\frac{10}{4}x + \frac{1}{4}$

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

Neg reciprocals

Perpendicular

19.  $4x - y = 3$  and  $x - 4y = -2$   
 $-4x$        $-x$

$-y = -4x + 3$

$-4y = -x - 2$

$y = 4x - 3$

$y = \frac{1}{4}x + \frac{1}{2}$

Neither

20.  $5x - 2y = 7$  and  $2x + 5y = 7$   
 $-5x$        $-2x$

$-2y = -5x + 7$

$5y = -2x + 7$

$y = \frac{5}{2}x - \frac{7}{2}$

$y = -\frac{2}{5}x + 7$

Neg reciprocals

Perpendicular

Write the equation of a line passing through the given set of points in **slope – intercept form**

21. (3, 5) and (2, 4)

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

$$\frac{5 - 4}{3 - 2} = \frac{1}{1} = m = 1$$

$$5 = 3 + b$$

$$\begin{array}{r} -3 \\ -3 \end{array}$$

$$b = 2$$

$$y = x + 2$$

22. (5, -2) and (-3, 1)

$$\frac{1 - (-2)}{(-3) - 5} = \frac{-3}{8} = m$$

$$1 = \frac{-3}{8}(-3) + b$$

$$1 = \frac{+9}{8} + b$$

$$\begin{array}{r} -\frac{9}{8} \\ -\frac{9}{8} \end{array}$$

$$\frac{8}{8} - \frac{9}{8} = b \rightarrow \frac{1}{8} = b$$

$$y = \frac{3}{8}x + \frac{1}{8}$$

23. (-4, 1) and (-2, -3)

$$\frac{-3 - 1}{-2 - (-4)} = \frac{-4}{2} = -2 = m$$

$$1 = -2(-4) + b$$

$$1 = 8 + b$$

$$\begin{array}{r} -8 \\ -8 \end{array}$$

$$-7 = b$$

$$y = -2x - 7$$

24. (-1, -2) and (-6, -4)

$$\frac{-4 - (-2)}{-6 - (-1)} = \frac{-2}{-5} = \frac{2}{5} = m$$

$$-4 = \frac{2}{5}(-6) + b$$

$$-4 = \frac{-12}{5} + b$$

$$\begin{array}{r} +\frac{12}{5} \\ +\frac{12}{5} \end{array}$$

$$\frac{-20}{5} + \frac{12}{5} = b \rightarrow \frac{-8}{5} = b$$

$$y = \frac{2}{5}x + \frac{8}{5}$$

25. (6, -2) and (-3, 2)

$$\frac{2 - (-2)}{-3 - 6} = \frac{4}{-9} = m$$

$$2 = \frac{4}{-9}(-3) + b$$

$$2 = \frac{4}{3} + b$$

$$\begin{array}{r} -\frac{4}{3} \\ -\frac{4}{3} \end{array}$$

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

$$\frac{6}{3} - \frac{4}{3} = b \rightarrow b = \frac{2}{3}$$

26. (0, 0) and (-3, 2)

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

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

$$0 = b$$

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

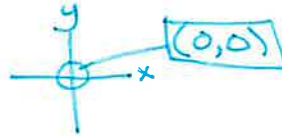
EXTENDING LEVEL QUESTIONS

With the information provided, use reasoning to answer the following questions

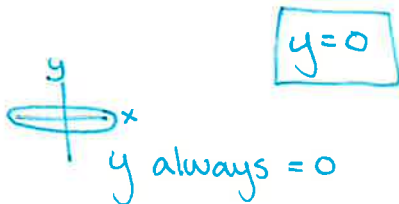
27. If a line is horizontal, what is the slope of any line perpendicular to it?

— ← slope of horizontal = 0  
 | ← slope of perpendicular =  
undefined

28. If the graph of a linear equation has one point that is both the  $x$ -intercept and  $y$ -intercept, where is that point?



29. What is the equation of the  $x$ -axis?



30. What is the equation of the  $y$ -axis?



31. What is the  $x$ -intercept of the line  $ax + by = c$ ?

looking for  $x \rightarrow$  set  $y$  to 0  
 $ax + b\overbrace{0}^{\rightarrow} = c$   
 solve for  $x \rightarrow ax = c$   
 $x = \frac{c}{a}$

32. What is the slope of the line  $ax + by = c$ ?

slope =  $m$   
 isolate  $y \rightarrow ax + by = c$   
 $y = \frac{-ax + c}{b}$   
 slope is constant paired with  $x$   
 $m = \frac{-a}{b}$