Parallel and Perpendicular Lines

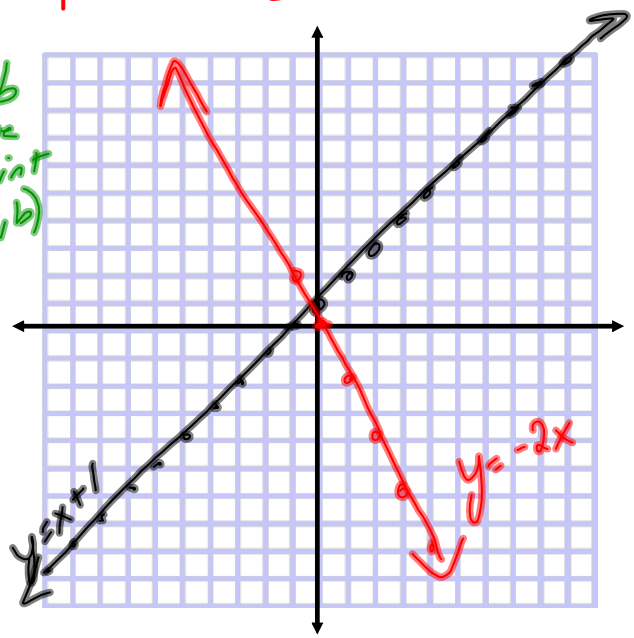
1. Graph: y = x + 1
y = -2x

$y = mx + b$
m = slope
b = y int
(0, b)

$y = x + 1$

$m = \frac{1}{1}$ R 1
→ 1
$b = 1$
(0, 1)

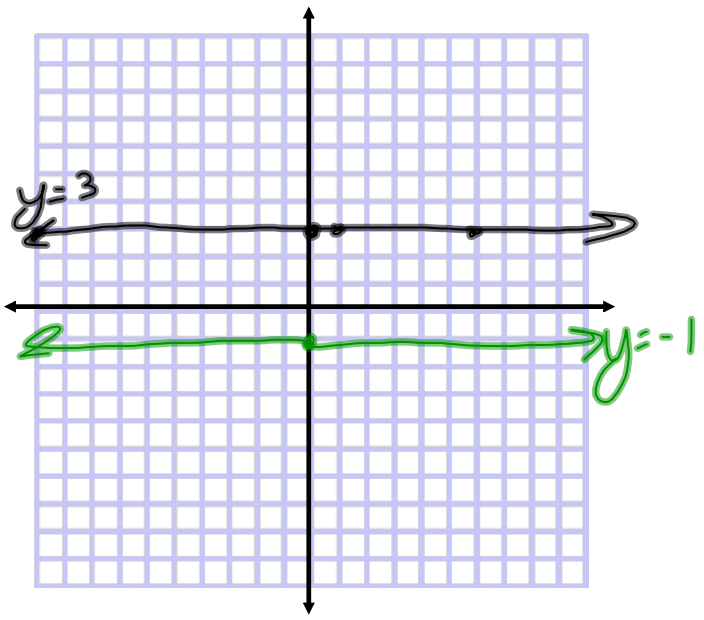
$y = -2x$
$m = \frac{-2}{1}$
$b = 0$
(0, 0)



2. Graph: y = 3

$y = mx + b$

$m = 0$
$b = 3$



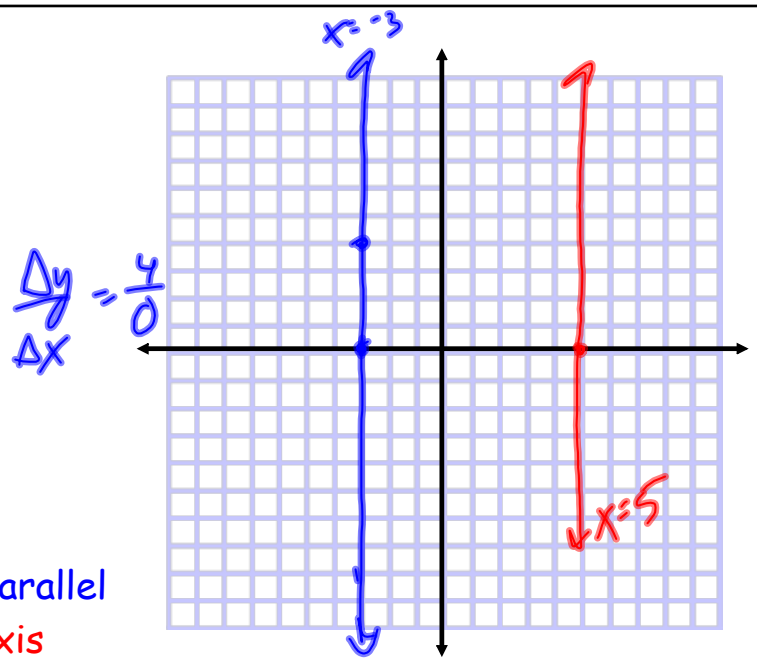
A line y = b is parallel to the x - axis

3. Graph: y = -1

4. Graph: $x = 5$

No slope

Undefined



A line $x = a$ is parallel to the y - axis

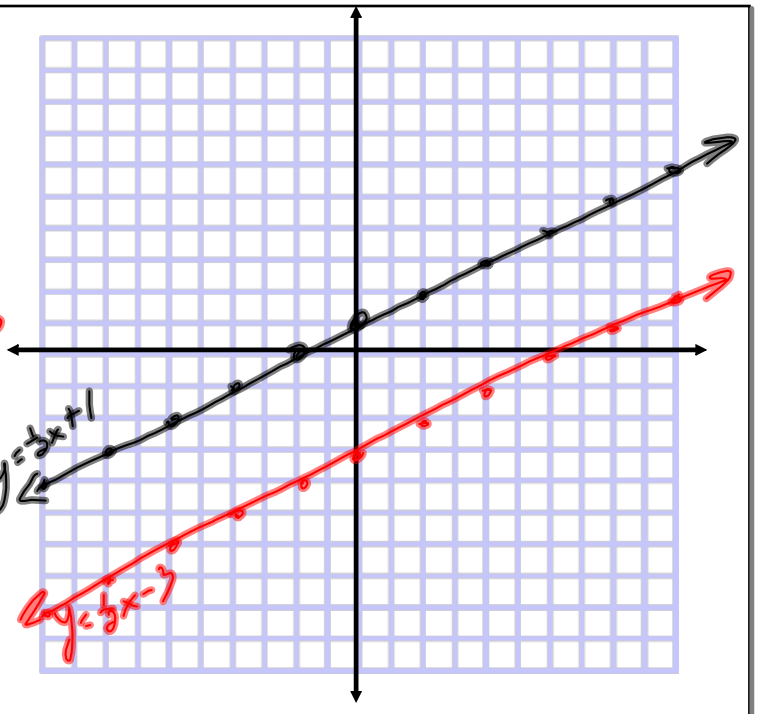
5. Graph: $x = -3$

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

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

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

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



Lines that have equal slopes are parallel

7. Graph: $y = \frac{3}{2}x + 4$

$y = -\frac{2}{3}x - 6$

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

$m = \frac{3}{2} \uparrow 3 \rightarrow 2$

$b = 4$

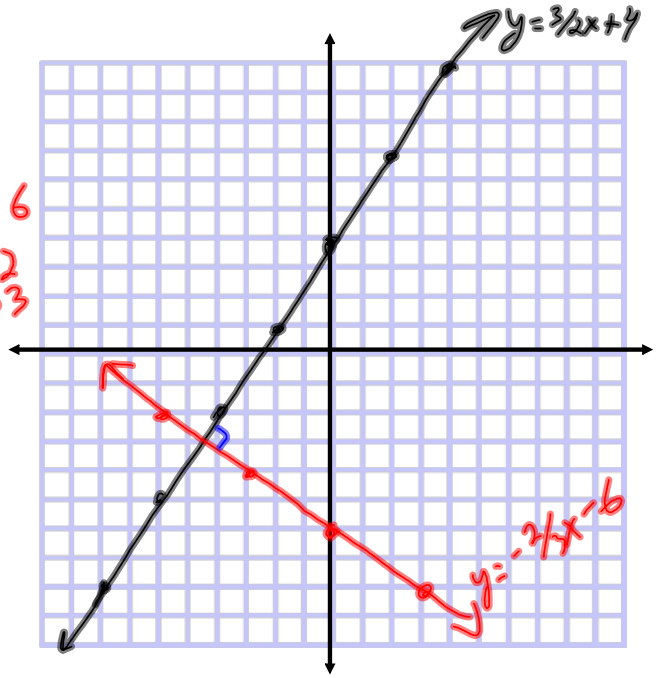
$(0, 4)$

$y = -\frac{2}{3}x - 6$

$m = -\frac{2}{3} \downarrow 2 \rightarrow 3$

$b = -6$

$(0, -6)$



Perpendicular lines have negative reciprocal slopes.

✓ opposite signs

8. Tell whether the lines are parallel, perpendicular, or neither:

$\frac{6}{1} \rightarrow -\frac{1}{6}$

a. $y = \frac{1}{2}x - 10$

$y = \frac{1}{2}x + 10$

parallel

//

Same slope

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

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

neither

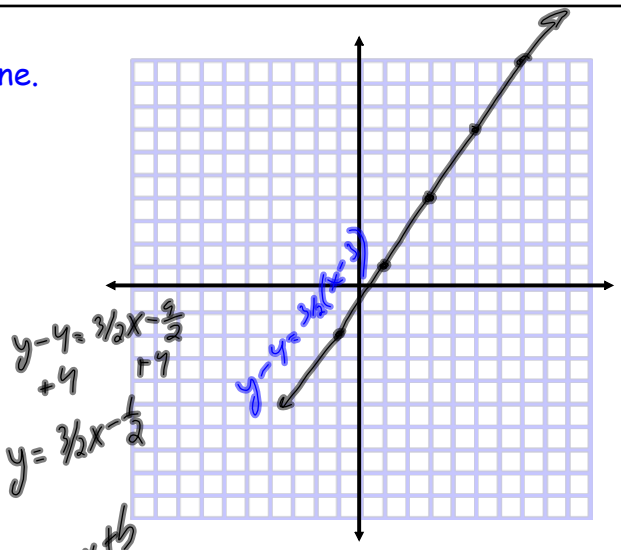
c. $y = 6x + 12$

$y = -\frac{1}{6}x - 15$

perpendicular

⊥

9. Plot (1, 1) and (3, 4) and write the equation of the line.



m $= \frac{y_2 - y_1}{x_2 - x_1} = \frac{4-1}{3-1} = \frac{3}{2}$

b ?

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

$y - y_1 = m(x - x_1)$

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

$+4 \quad +4$

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

$y = mx + b$

Point-Slope Form :

$y - y_1 = m(x - x_1)$

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

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

$+1 \quad +1$

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

10. Write the equation of the line in point slope form given the following:

$y - y_1 = m(x - x_1)$

a. m = 2, (6, 3)

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

b. m = -5, (-4, 1)

$y - 1 = -5(x - -4)$

$y - 1 = -5(x + 4)$

c. $m = \frac{5}{6}$, (2, 0)

$y - 0 = \frac{5}{6}(x - 2)$

d. m = 10, (-1, -7)

$y - -7 = 10(x - -1)$

$y + 7 = 10(x + 1)$

HW: Worksheet

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

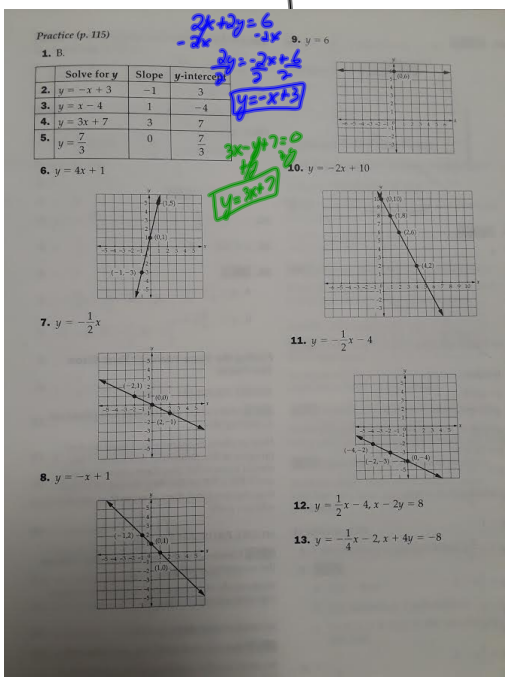
$m=\frac{1}{4}$

$(7,4)$

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

$m=\frac{3}{1}$

$(4,-2)$



Practice (p. 115)

1. B.

	Solve for y	Slope	y-intercept
2.	$y = -x + 3$	-1	3
3.	$y = x - 4$	1	-4
4.	$y = 3x + 7$	3	7
5.	$y = \frac{7}{3}$	0	$\frac{7}{3}$

$2x+2y=6$, $-2x$, $\frac{2y}{2}=\frac{-2x+6}{2}$, $y=-x+3$

$3x-y+7=0$, $y=3x+7$

6. $y = 4x + 1$

7. $y = -\frac{1}{2}x$

8. $y = -x + 1$

9. $y = 6$

10. $y = -2x + 10$

11. $y = -\frac{1}{2}x - 4$

12. $y = \frac{1}{2}x - 4, x - 2y = 8$

13. $y = -\frac{1}{4}x - 2, x + 4y = -8$