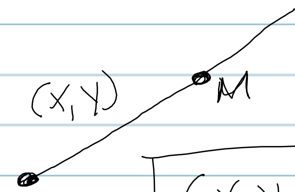
Midpoint = $(-3, 5)$
Endpoint = $(2, -1)$

Find the other endpoint



$\boxed{\begin{matrix}(x, y)\\(2, -1)\end{matrix}}$

$$(x_m, y_m) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

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

$$\quad -3 \qquad\qquad 5$$

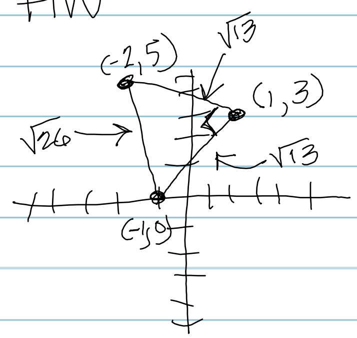
$\frac{x+2}{2} = -3$ $\qquad$ $\frac{y-1}{2} = 5$ $\qquad$ $\boxed{(-8, 11)}$

$x + 2 = -6$ $\qquad$ $y - 1 = 10$

$x = -8$ $\qquad$ $y = 11$

SECTION 2.1 HW

(29) $(-2, 5)$
$(1, 3)$
$(-1, 0)$



d
$(-2, 5)$
$(1, 3)$

$= \sqrt{(-2-1)^2 + (5-3)^2}$
$= \sqrt{9 + 4}$
$= \sqrt{13}$

$a^2 + b^2 = c^2$
$(\sqrt{13})^2 + (\sqrt{13})^2 = (\sqrt{26})^2$
$13 + 13 = 26$
$26 = 26$ ✓

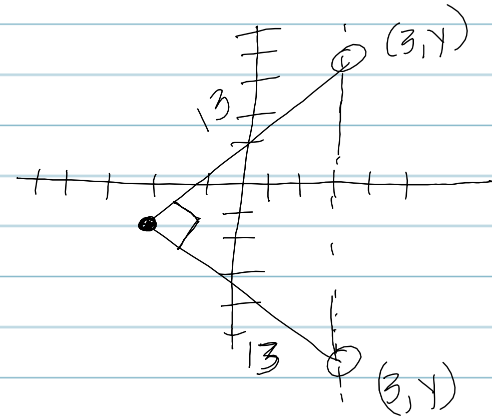
d
$(1, 3) = \sqrt{(1 - -1)^2 + (3-0)^2}$
$(-1, 0) = \sqrt{13}$

$A = \frac{1}{2}bh = \frac{1}{2}(\sqrt{13})(\sqrt{13})$

$A = \boxed{\frac{13}{2}}$

d
$(-1, 0) = \sqrt{(-1 - -2)^2 + (0-5)^2}$
$(-2, 5) = \quad 1 \qquad\qquad 25$
$= \sqrt{26}$

45* $d = 13$ $(-2,-1)$ $(3, y)$



$$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$$

$(3, y)$
$(-2,-1)$

$$=\sqrt{(3--2)^2+(y--1)^2}=13$$

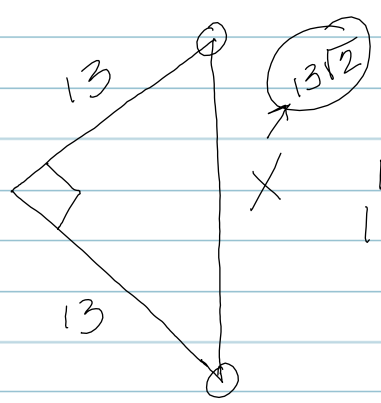
$$=\sqrt{\overset{5}{25}+(y+1)^2}=13$$

$$\left(\sqrt{25+(y+1)^2}\right)^2=13^2$$

$$25+(y+1)^2=169$$
$$-25 \qquad\qquad -25$$

$$(y+1)^2=144$$
$$y+1=\pm\sqrt{144}$$
$$y+1=\pm 12$$
$$y=-1\pm 12 \rightarrow -1+12 \qquad -1-12$$
$$11 \qquad -13$$

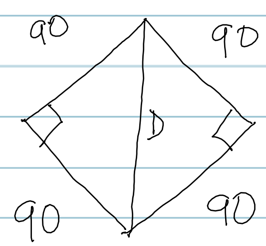
$(3,11)$ $(3,-13)$



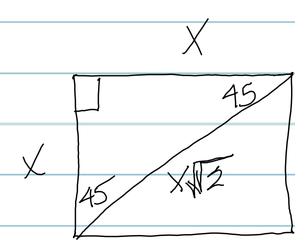
$$13^2+13^2=x^2$$
$$169+169=x^2$$
$$2(169)=x^2$$
$$\sqrt{2(169)}=x$$
$$13\sqrt{2}=x$$

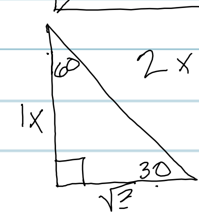
$(3, y_2)$
$(3, y_1)$

59



$$90^2+90^2=D^2$$
$$2(90)^2=D^2$$
$$\sqrt{2(90)^2}=D$$
$$90\sqrt{2}=D$$
$$127.28=D$$





$\boxed{\text{SECTION 2.3}}$

WRITING EQUATIONS OF LINES

1) SLOPE
2) POINT

SLOPE: (m) $\dfrac{\text{rise}}{\text{run}}$

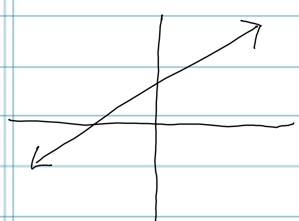
2 points

(x_1, y_1) (x_2, y_2)

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

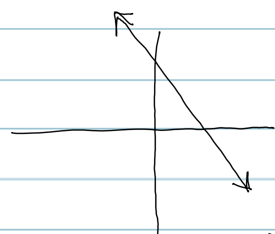
equation

$y = mx + b$



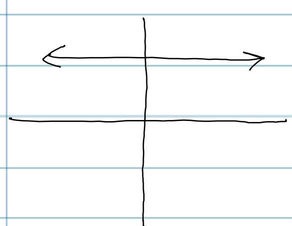
positive

uphill (L to R)



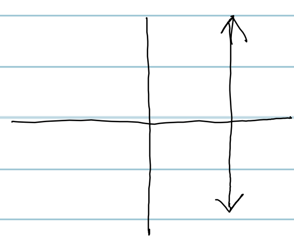
negative

downhill (L to R)



zero

$m = 0$



$m =$ undefined slope

parallel lines:

same slope //

perpendicular lines: opposite reciprocal slopes

$\frac{2}{3}$ $-\frac{3}{2}$ $m_1 m_2 = -1$

SET UP FORM
(point slope form)

$y - y_1 = m(x - x_1)$ (traditional) or $m = \dfrac{y_2 - y_1}{x\quad x_1}$ (proportion version)

standard
$ax + by = c$

$a > 0$ (+)
$a \neq$ fraction

slope-intercept form
$y = mx + b$
(solve for y)

Vertical lines: $x = c$

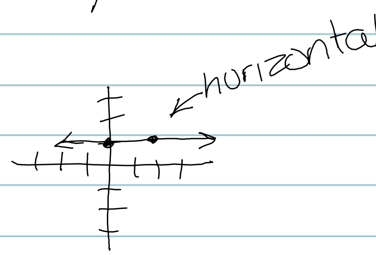
$x = 2$

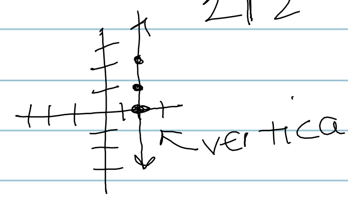
X	Y
2	0
2	1
2	2

Horizontal lines: $y = c$

$y = 1$

X	Y
0	1
2	1
100	1





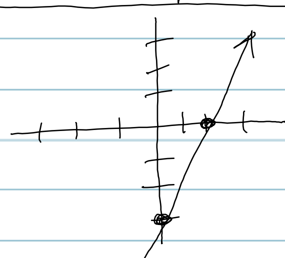
Graphing: $\boxed{3x - 2y = 6}$

X	Y
0	-3
2	0

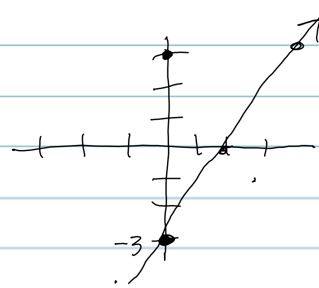
$m = \dfrac{-3-0}{0-2}$

$= \dfrac{-3}{-2}$

$m = \dfrac{3}{2}$



(OR) $3x - 2y = 6$
$-2y = -3x + 6$
$y = \dfrac{-3}{-2}x + \dfrac{6}{-2}$
$y = \dfrac{3}{2}x + 3$



WRITE THE EQUATION OF THE LINE THROUGH (-2, 4) THAT IS PERPENDICULAR TO THE LINE $3x-4y=12$. WRITE YOUR ANSWER IN BOTH STANDARD AND SLOPE INTERCEPT FORM.

* start with point slope form

point: $(-2,4)$

slope: $\perp$ to $3x-4y=12$

$-4y=-3x+12$

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

need: $(-2,4)$

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

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

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

slope-intercept (solve for y) $\rightarrow$ $y-4=-\frac{4}{3}x-\frac{8}{3}$

$y=-\frac{4}{3}x-\frac{8}{3}+\frac{4}{1}\cdot\frac{3}{3}$

$y=-\frac{4}{3}x-\frac{8}{3}+\frac{12}{3}$

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

standard form:

$ax+by=c$

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

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

$3y-12=-4x-8$

$4x+3y=-8+12$

$4x+3y=4$

traditional (proportion)

$m=\frac{y-y_1}{x-x_1}$

standard $\rightarrow$ $ax+by=c$

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

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

$4x+8=-3y+12$

$4x+3y=12-8$

$4x+3y=4$

slope-intercept

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

$$y = mx + b$$

$$3(y-4) = -4(x+2)$$
$$3y - 12 = -4x - 8$$
$$3y = -4x - 8 + 12$$
$$3y = -4x + 4$$
$$y = -\frac{4}{3}x + \frac{4}{3}$$

Write the equation of the line through (-1, 4) that is perpendicular to the line $x = 3$.

vertical line

$(-3, 7)$

$x = -3$

$\perp$ to vertical lines

horizontal lines

$(-1, 4)$

$y = 4$