121 §1.4 #s 1-8 All, 4, 10, 13, 15, 17, 19, 22, 23, 25, 27, 30, 35, 38,
#s 9-18 Find slope. 40, 43, 45, 47, 57, 59, 66, 67, 69, 70, 71, 73, 76, 80, 85, 86, 104

(9) $(x_1, y_1) = (-2, 3)$, $(x_2, y_2) = (4, 5)$ $\Rightarrow$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5-3}{4-(-2)} = \frac{2}{6} = \boxed{\frac{1}{3} = m}$

(10) $(-1, 2)$, $(3, 6)$ $\Rightarrow$ $m = \frac{6-2}{3-(-1)} = \frac{4}{4} = \boxed{1 = m}$

(15) $\left(\frac{1}{8}, \frac{1}{4}\right)$, $\left(\frac{1}{4}, \frac{1}{2}\right)$ $\Rightarrow$ $m = \frac{\frac{1}{2} - \frac{1}{4}}{\frac{1}{4} - \frac{1}{8}} = \frac{\frac{2-1}{4}}{\frac{2-1}{8}} = \frac{\frac{1}{4}}{\frac{1}{8}}$

$= \frac{1}{4} \cdot \frac{8}{1} = \frac{8}{4} = \boxed{2 = m}$

(13) $(5, 2)$, $(-3, 2)$ $\Rightarrow$ $m = \frac{2-2}{5+3} = \frac{0}{8} = \boxed{0 = m}$

~~(14)~~ (17) $(5, -1)$, $(5, 3)$ $\Rightarrow$ $m = \frac{3-(-1)}{5-5} = \frac{4}{0}$ $\boxed{\text{DNE}}$

#s 19-26 Find ~~the~~ an equation of the line thru the given points. Solve for y, if possible

$y = mx + b$, $y = m(x - x_1) + y_1$

(19) $(-1, -1)$, $(3, 4)$ $\Rightarrow$ $m = \frac{4-(-1)}{3-(-1)} = \frac{5}{4} = m$

$y = m(x - x_1) + y_1$ STOP! GOOD ENOUGH. POINT-SLOPE FORM

$y = \frac{5}{4}(x - (-1)) + (-1) = \boxed{\frac{5}{4}(x+1) - 1 = y}$

Now, if I ask for slope-intercept, keep going:

$y = \frac{5}{4}(x+1) - 1 = \frac{5}{4}x + \frac{5}{4} - 1 \rightarrow$ $\boxed{\frac{5}{4}x + \frac{1}{4} = y}$ SLOPE-INT

If I ask for GENERAL FORM, then

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

$5x + 1 = 4y$

$\boxed{5x - 4y = -1}$ GENERAL

(22) $(-3,5), (2,1) \rightarrow m = \frac{1-5}{2-(-3)} = \frac{-4}{5}$

$\boxed{y = -\frac{4}{5}(x+3) + 5}$ or $y = -\frac{4}{5}(x-2) + 1$

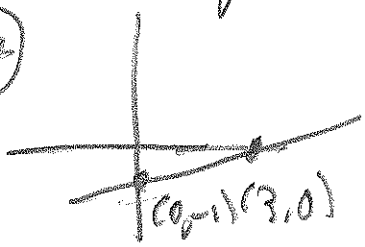
(23) $(3,5), (-3,5)$ 2 y-values same $\boxed{y = 5}$ HORIZONTAL

(25) $(4,-3), (4,12)$ 2 x-values same $\boxed{x = 4}$ VERTICAL

~~#s~~ 27 - 34

Write equation in slope-intercept form

(27)

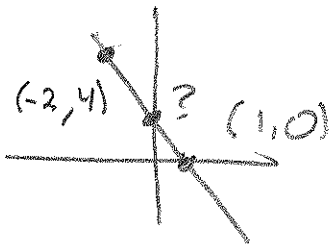


$m = \frac{0-(-1)}{3-0} = \frac{1}{3}$, $b = -1 \rightarrow$

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

121 §1.4

(30) $y = ?$ $\quad m = \frac{0-4}{1-(-2)} = \frac{-4}{3}$



$y = -\frac{4}{3}(x-1) + 0$

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

~~#s~~ 35-42 Write eq'n in slope-intercept form & identify slope & y-intercept.

(35) $3x - 5y = 10$

$-5y = -3x + 10$

$y = \frac{-3}{-5}x + \frac{10}{-5}$

$y = \frac{3}{5}x - 2$

$m = \frac{3}{5}$, $(0,b) = (0,-2)$

(38) $y + 5 = -3(x - (-1))$ looks like someone did $y - y_1 = m(x - x_1)$. I do $y = m(x - x_1) + y_1$, myself, to START with y all by itself!

$y + 5 = -3x - 3$

$y = -3x - 8$

$m = -3$

$(0,b) = (0,-8)$

(40) $y = -\frac{3}{2}(x+5) + 2$

$= -\frac{3}{2}x - \frac{15}{2} + \frac{4}{2}$

$m = -\frac{3}{2}$, $(0,b) = (0, -\frac{11}{2})$

$y = -\frac{3}{2}x - \frac{11}{2}$

#s 43–46 Find eq'n in slope-intercept form.

(43) Contains $(-8,5)$, $m = \frac{1}{4}$

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

$= \frac{1}{4}(x - (-8)) + 5$

$= \frac{1}{4}(x+8) + 5$

$= \frac{1}{4}x + \frac{8}{4} + 5$

$= \frac{1}{4}x + 2 + 5$

$m = \frac{1}{4}$, $(0,b) = (0,7)$

$y = \frac{1}{4}x + 7$

(45) Thru $(-3,-2)$, $m = -\frac{1}{2}$

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

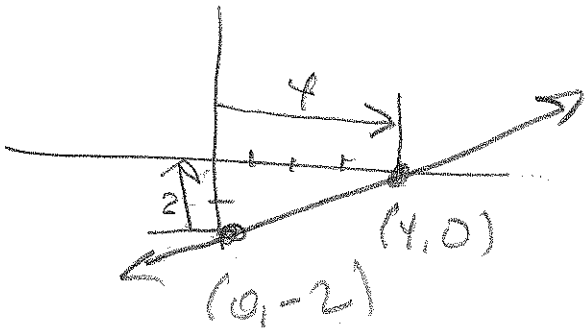
$= -\frac{1}{2}x - \frac{3}{2} - \frac{4}{2}$

$m = -\frac{1}{2}$, $(0,b) = (0, -\frac{7}{2})$

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

*S47-56 Use y-intercept & slope to sketch (USUALLY, I WANT BOTH INTERCEPTS, BUT IT'S ALSO GOOD to Interpret as slope with a starting point.)

(47) $y = \frac{1}{2}x - 2$ $\quad m = \frac{1}{2} = \frac{up\ 1}{right\ 2} = \frac{up\ 2}{right\ 4}$ $\quad b = -2$



*S57-66 GENERAL FORM / STANDARD FORM

$Ax + By = C$, $A, B, C \in \mathbb{Z}$.

(57) $(3,0), (0,-4)$ $\quad m = \frac{-4-0}{0-3} = \frac{-4}{-3} = \frac{4}{3}$

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

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

§2.1 S1.4

(59) $(2,3), (-3,-1) \longrightarrow m = \frac{-1-3}{-3-2} = \frac{-4}{-5} = \frac{4}{5}$

$y = \frac{4}{5}(x-2)+3$

$= \frac{4}{5}x - \frac{8}{5} + \frac{15}{5}$

$y = \frac{4}{5}x + \frac{7}{5}$

$5y = 4x + 7$

$\boxed{-4x+5y=7}$

(66) $(-\frac{3}{8}, \frac{1}{4}), (\frac{1}{2}, -\frac{1}{6})$

$\longrightarrow m = \frac{-\frac{1}{6}-\frac{1}{4}}{\frac{1}{2}-(-\frac{3}{8})} = \frac{\frac{-2-3}{12}}{\frac{4+3}{8}} = \frac{\frac{-5}{12}}{\frac{7}{8}} = (-\frac{5}{12})(\frac{8}{7})$

$= (-\frac{5}{3})(\frac{2}{7}) = -\frac{10}{21} = m$

$\frac{2}{28} = \frac{1}{14}$

LCD = 3·7·2 = 42

$y = -\frac{10}{21}(x+\frac{3}{8})+\frac{1}{4}$

$= -\frac{10}{21}x - \frac{30}{168} + \frac{1}{4}$

$= -\frac{10}{21}x - \frac{5}{28} + \frac{7}{28}$

$y = -\frac{10}{21}x + \frac{1}{14}$

$42y = -20x + 3$

$\boxed{20x+42y=3}$

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#s 67-72 Find slope of line described.

(67) Line parallel to $y = .5x - 9$

$$m_{\parallel} = .5$$

(69) Line perpendicular to $3y - 3x = 7$

$3y = 3x + 7$

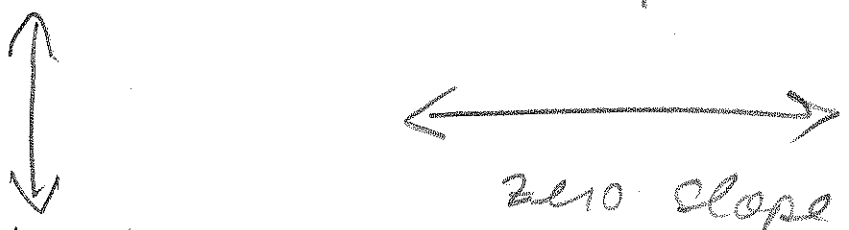
$y = x + \frac{7}{3}$

$m = 1 \Longrightarrow m_{\perp} = \frac{-1}{1} = -1 = m_{\perp}$

(71) Line perpendicular to $x = 0$ (No slope, ∞ slope, $\frac{1}{0}$ slope)

$m_{\perp} = 0$ $(m_{\parallel} \not\exists)$

↳ The negative reciprocal of no slope is zero slope



zero slope.

No slope (Can't assign a number to it)

21 5' 1.4 A

(70) A line perpendicular to $2x-3y=8$

$m=-\frac{A}{B}=\frac{-2}{-3}=\frac{2}{3}=m$ → $m_1=-\frac{3}{2}$

$Ax+By=C \Rightarrow m=-\frac{A}{B}$ (I rarely push memorizing this, but if you do, that is OK.)

#s 73-84 Write an equation in standard form, using INTEGER COEFFICIENTS. Sketch

$Ax+By$ with $A, B, C \in \mathbb{Z}$ = Integers

(73) $m=2$, thru $(1,-2)$

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

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

$=2x-2-2$

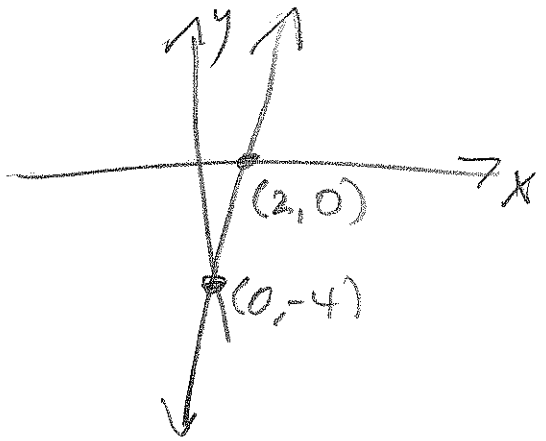
$y=2x-4$

$-2x+y=-4$ OK

OR

$2x-y=4$ Prettier

x	y
0	-4
2	0



121 5'1, 4

(76) Thru $(-2,3)$, parallel to $y=\frac{1}{2}x+735$

$m=\frac{1}{2}=m_{\parallel}$

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

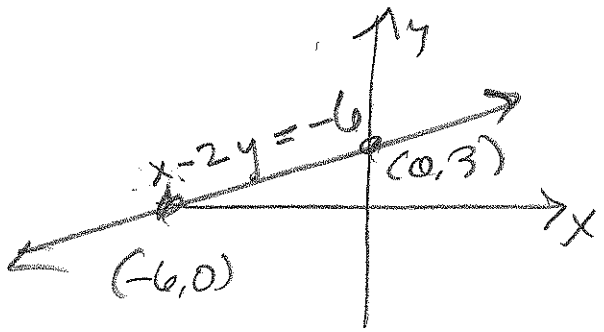
$=\frac{1}{2}x+1+3$

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

$2y=x+6$

$-x+2y=6$ Not a problem

$\boxed{x-2y=-6}$ pretty (ier)



x	y
0	3
-6	0

(80) Thru $(5,4)$ and perpendicular to $y=9x+5$

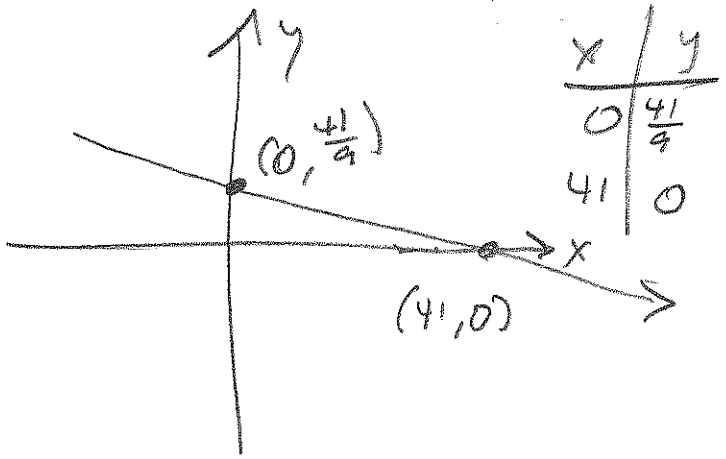
$m=9 \Rightarrow m_{\perp}=-\frac{1}{9}$

$y=-\frac{1}{9}(x-5)+4$

$y=-\frac{1}{9}x+\frac{5}{9}+4$

$9y=-x+5+36$

$\boxed{x+9y=41}$



x	y
0	$\frac{41}{9}$
41	0

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#85-88 Find the value of a.

(85) The line thru (-2, 3) and (8, 5) is ⊥ to $y = ax + 2$.

Find m. Want $m_\perp$!

$$m = \frac{5-3}{8-(-2)} = \frac{2}{10} = \frac{1}{5} = m \longrightarrow m_\perp = -\frac{5}{1} = -5$$

$m_\perp = \boxed{a = -5}$

(86) The line thru (3, 4) & (7, a) has slope $m = \frac{2}{3}$.

$$m = \frac{a-4}{7-3} = \frac{a-4}{4} = \frac{2}{3} \longrightarrow$$

LCD = 3(4) = 12

$$\frac{3a-12}{LCD} = \frac{8}{LCD}$$

$$3a - 12 = 8$$

$$3a = 20$$

$$\boxed{a = \frac{20}{3}}$$

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(104) @ $10 per ticket = $10 \frac{\$}{\text{ticket}}$, 8000 seats will be sold. Attendance drops by $\frac{500 \text{ tickets}}{\$1 \text{ increase}}$ in price. We write the

[# of tickets sold = n] (y)

as a function of ticket price, $P = f(x)$

How much $ if tickets priced @ $20?

[P = price of a ticket ($)]

Given $(P_1, n_1) = (10, 8000)$ and

$= (x_1, y_1)$

$$\text{Slope} = -\frac{500 \text{ tickets}}{1 \underset{\text{in price}}{\$ \text{ increase}}} = -500 = m$$

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

$n = m(P - P_1) + n_1$

[$n = -500(P - 10) + 8000$] Model

Want to know $n(20)$ ("n of 20")

$= -500(20 - 10) + 8000$

$= -500(10) + 8000 =$ [3000 tickets.]

Revenue = price · n = (3000)(20) = [$60,000]

When price is $20