Mat 1033C
Larson 3.1, 3.3, 3.4, 3.5

SOLUTIONS to PRACTICE FOR TEST (V3)

① slope (5, −9) (−2, 7)

$$m = \frac{-9-7}{5--2} = \frac{-16}{7}$$

② slope (−2, 5) (4, −2)

$$m = \frac{5--2}{-2-4} = \frac{7}{-6}$$

③ slope of $2x - 8y = 6$

Solve for y

$-8y = -2x + 6$

$y = \frac{-2}{-8}x + \frac{6}{-8}$

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

$y = mx + b$

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

④ slope of line // to $4x - 7y = 64$ (so lines need same slope)

$4x - 7y = 64$

$-7y = -4x + 64$

$y = \frac{-4}{-7}x + \frac{64}{-7}$

$y = \frac{4}{7}x - \frac{64}{7}$

$m = \frac{4}{7}$

⑤ slope of line ⊥ to $y = 6x - 7$

we need the opposite reciprocal of 6

$m = -\frac{1}{6}$

check: $(6)(-\frac{1}{6}) = -1$ ✓

⑥ equation in standard form $(ax + by = c)$

(−5, 4) (−3, −8)

need: $m = -6$; point = (−5, 4) (either point will work)

$$m = \frac{4--8}{-5--3} = \frac{12}{-2} = -6$$

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

$y - 4 = -6(x - -5)$

$y - 4 = -6(x + 5)$

$y - 4 = -6x - 30$

$6x + y = -30 + 4$

$6x + y = -26$

⑦ (4, 6) (−5, 8) $m = \frac{6-8}{4--5} = \frac{-2}{9}$

need: point: $(4, 6) = (x_1, y_1)$

slope $\Rightarrow m = -\frac{2}{9}$

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

$y - 6 = -\frac{2}{9}(x - 4)$

$y - 6 = -\frac{2}{9}x + \frac{8}{9}$

slope intercept form $\Rightarrow$ solve for y

$y = -\frac{2}{9}x + \frac{8}{9} + 6$

$y = -\frac{2}{9}x + \frac{8}{9} + \frac{6}{1} \cdot \frac{9}{9}$

$y = -\frac{2}{9}x + \frac{8+54}{9}$

$y = -\frac{2}{9}x + \frac{62}{9}$

⑧ vertical $\Rightarrow x = c$

through (5, −3) $\Rightarrow x = 5$

⑨ horizontal $\Rightarrow y = c$

through (9, −2) $\Rightarrow y = -2$

(10) through $(2,-2)$
// to $x=5$

$\Rightarrow \boxed{x=2}$

(11) through $(7,-1)$
$\perp$ to $x=12$

$\Rightarrow \boxed{y=-1}$

(12) through $(6,-7)$
parallel to $3x+y=10$
answer $\Rightarrow$ slope-intercept form

need: point $(6,-7)$
slope: $m=-3$

$3x+y=10$
$y=-3x+10$
$\boxed{m=-3}$

parallel $\Rightarrow$ same slope

$y-y_1=m(x-x_1)$
$y-(-7)=-3(x-6)$
$y+7=-3x+18$
$y=-3x+18-7$
$\boxed{y=-3x+11}$

(13) through $(-3,7)$
$\perp$ to $2x-7y=14$
answer in standard form $(ax+by=c)$

$2x-7y=14$
$-7y=-2x+14$
$y=\frac{-2}{-7}x+\frac{14}{-7}$
$y=\frac{2}{7}x-2$

we need the opposite reciprocal slope

$\Rightarrow \boxed{m=-\frac{7}{2}}$
$\boxed{(-3,7)}$

$y-y_1=m(x-x_1)$
$y-7=\frac{-7}{2}(x-(-3))$
$y-7=\frac{-7}{2}(x+3)$
$y-7=\frac{-7}{2}x-\frac{21}{2}$
lcd $=2$ (multiply by it)
$2y-14=-7x-21$
$7x+2y=-21+14$
$\boxed{7x+2y=-7}$

(14) (a) $6x-y=4$
$-y=-6x+4$
$y=6x-4$

$12x-2y=-4$
$-2y=-12x-4$
$y=\frac{-12}{-2}x-\frac{4}{-2}$
$y=6x+2$

Same slopes $\Rightarrow$ parallel //

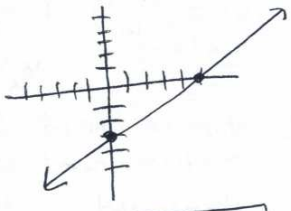
(b) $y=\frac{5}{4}x+8$
$y=-\frac{4}{5}x-4$

perpendicular ($\perp$)

opposite reciprocals
$(\frac{5}{4})(-\frac{4}{5})=-1$ ✓

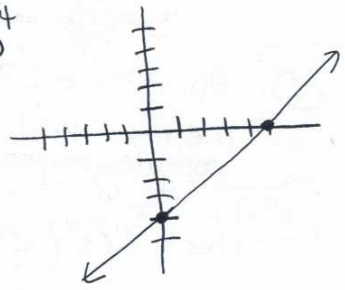
(15) (a) $\boxed{3x-5y=15}$ GRAPH IT

x	y
0	-3
5	0



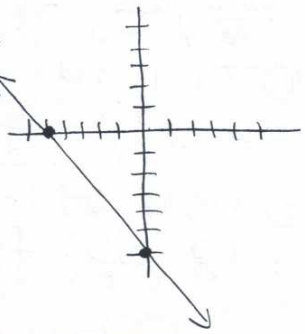
(b) $\boxed{-4x+5y=-20}$

x	y
0	-4
5	0



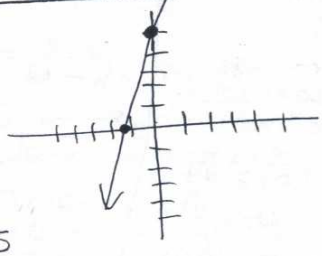
(15c) $-6x-5y=30$

x	y
0	-6
-5	0



(15d) $y=4x+5$

x	y
0	5
$-5/4$	0

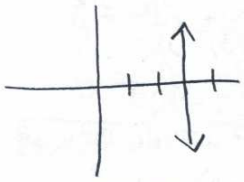


$0=4x+5$

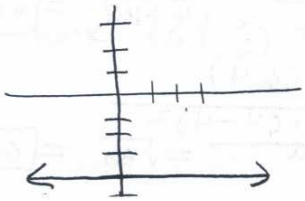
$-5=4x$

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

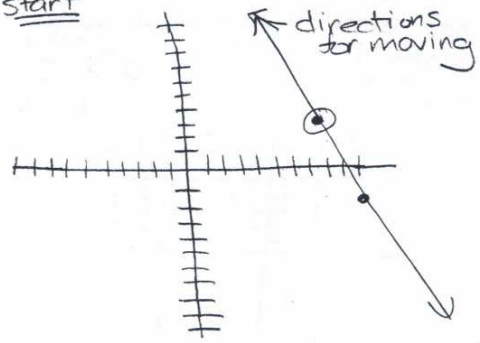
(15e) $x=3$ vertical



(15f) $y=-4$ horizontal

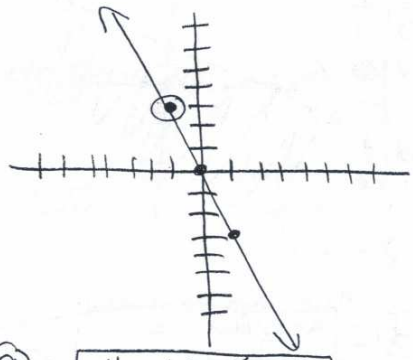


(16) (8, 3) start $m=\frac{-5}{2}$ $\frac{y}{x}$ $\frac{5}{-2}$



(17) (-1, 3) start

slope $m=-3=\frac{-3}{1}=\frac{3}{-1}$ directions

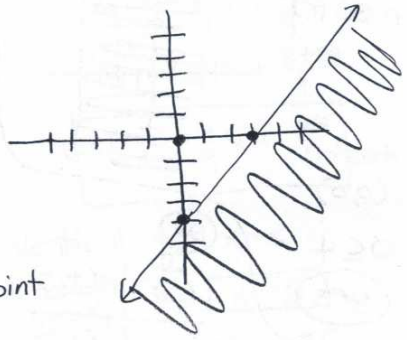


(18) (a) $-4x+3y\leq -12$

=

x	y
0	-4
3	0

solid line



test point (0,0)

$-4(0)+3(0)\leq -12$

$0\leq -12$

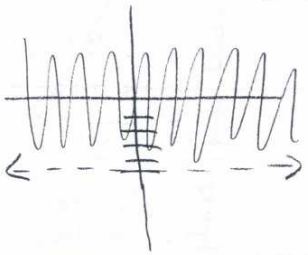
false

so (0,0) is not a solution ⇒ shade opposite

(18)(b) $y > -5$

horizontal dotted

test (0,0)
$0 > -5$
true

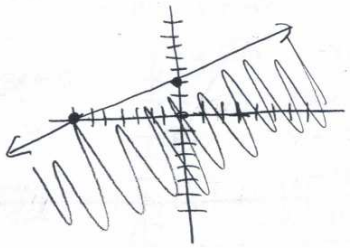


(18c) $2x - 7y \geq -14$

=

x	y
0	2
−7	0

solid line



test point, (0,0)

* you can use any point not on the line

$2(0) - 7(0) \geq -14$

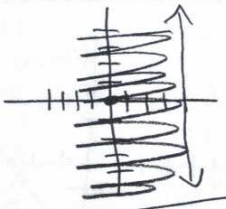
$0 \geq -14$

true $\Rightarrow$ (0,0) is a soln

so shade the side with (0,0)

(18)(d) $x \leq 4$

vertical solid



test (0,0)

$0 \leq 4$?

yes

(22)

II	I
(−,+)	(+,+)
(−,−)	(+,−)
III	IV

we need one + one − $\Rightarrow$ II or III

(19) (a) (−2,6) and (6,−5)

mid point $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$\left(\frac{-2+6}{2}, \frac{6-5}{2}\right) = \left(2, \frac{1}{2}\right)$

(b) (3,−4) and (−2,−7)

$\left(\frac{3-2}{2}, \frac{-4-7}{2}\right) = \left(\frac{1}{2}, \frac{-11}{2}\right)$

(c) (4,0) and (−2,0)

$\left(\frac{4-2}{2}, \frac{0+0}{2}\right) = (1,0)$

(21) (x,6) (−2,8)

$m = \frac{4}{5}$

$\frac{6-8}{x-(-2)} = \frac{4}{5}$

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

$-2(5) = 4(x+2)$

$-10 = 4x + 8$

$-18 = 4x$

$\frac{-18}{4} = \frac{-9}{2} = x$

(20) distance formula

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

(a) (−2,4) and (−3,7)

$d = \sqrt{(-3-(-2))^2 + (7-4)^2}$

$= \sqrt{(-3+2)^2 + 3^2} = \sqrt{(-1)^2 + 3^2} = \sqrt{10}$

(b) (7,12) and (5,−1)

$d = \sqrt{(7-5)^2 + (12-(-1))^2}$

$d = \sqrt{2^2 + 13^2} = \sqrt{4+169} = \sqrt{173}$

(c) (0,4) and (6,4)

$d = \sqrt{(6-0)^2 + (4-4)^2}$

$d = \sqrt{6^2 + 0^2} = \sqrt{36} = 6$