EOC Review (Day 1) - Solutions

1. $4x + 5y = -9$
$5(8x - y = -7)$

$4x + 5y = -9$
$40x - 5y = -35$
$44x = -44$
$x = -1$

$4(-1) + 5y = -9$
$-4 + 5y = -9$
$5y = -5$
$y = -1$

$(-1, -1)$

2. $2(-x + y = -14)$
$-3x - 2y = -2$

$-2x + 2y = -28$
$-3x - 2y = -2$
$-5x = -30$
$x = 6$

$-6 + y = -14$
$y = -8$

$(6, -8)$

3. $(-9x - 6y = 27)5$
$(8x + 5y = -23)6$

$-45x - 30y = 135$
$48x + 30y = -138$
$3x = -3$
$x = -1$

$-9(-1) - 6y = 27$
$9 - 6y = 27$
$-6y = 18$
$y = -3$

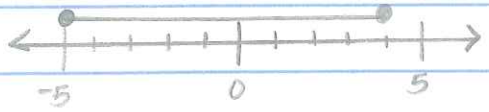
$(-1, -3)$

4. $-14 \leq -2-3n \leq 13$

$+2 \quad +2 \quad +2$

$\frac{-12}{-3} \leq \frac{-3n}{-3} \leq \frac{15}{-3}$

$4 \geq n \geq -5$



5. 3. $|x-7| \leq 5 \cdot 3$

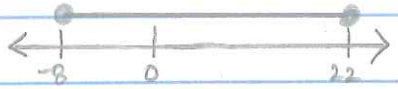
$\frac{}{3}$

Less than and

$|x-7| \leq 15$

$x-7 \leq 15 \qquad x-7 \geq -15$

$x \leq 22 \qquad x \geq -8$



6. $|-3x+5| < 17$

$-3x+5 < 17 \qquad -3x+5 > -17$

$-3x < 12 \qquad -3x > -22$

$x > -4 \qquad x < \frac{22}{3}$

7. $7|m+10|+2 \leq -5$

$7|m+10| \leq -7$

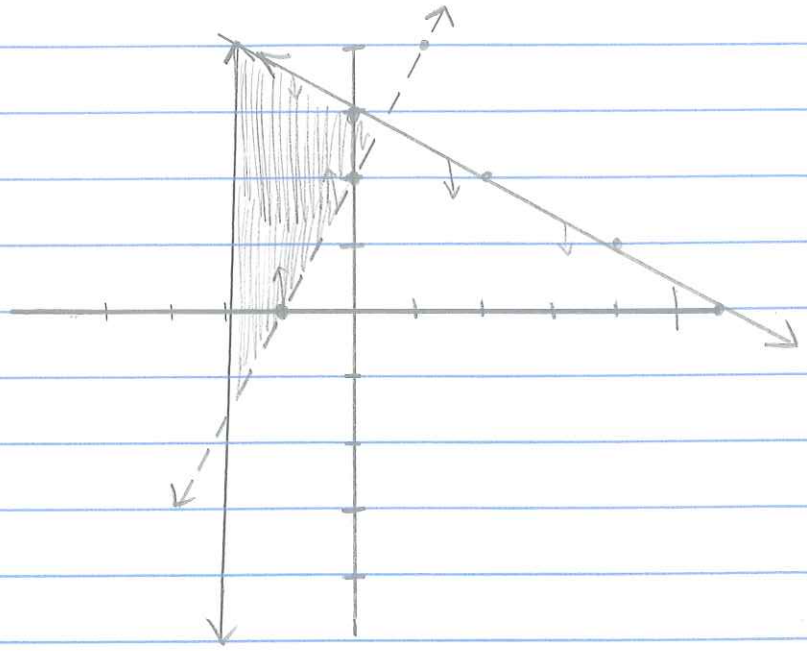
$|m+10| \leq -1$ ← No Solution

can't have an absolute value less than a negative number

8. $x+2y \leq 6$

$2x-y < -2$

$x \geq -2$



$x+2y \leq 6$

$2y \leq -x+6$

$y \leq -\frac{1}{2}x+3$

$2x-y < -2$

$-y < -2x-2$

$y > 2x+2$

9. $3|x+4|-5 < 16$

$3|x+4| < 21$

$|x+4| < 7$

$x+4 < 7$ $\qquad$ $x+4 > -7$

$x < 3$ $\qquad$ $x > -11$

10. $4-3x \leq -5$

$-3x \leq -9$

$x \geq 3$

11. $\begin{bmatrix} 3 & -1 & -2 \\ -5 & -4 & 6 \\ -4 & -2 & -3 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 10 \\ 9 \\ 9 \end{bmatrix}$

$\begin{bmatrix} 3 & -1 & -2 \\ -5 & -4 & 6 \\ -4 & -2 & -3 \end{bmatrix}^{-1} \cdot \begin{bmatrix} 10 \\ 9 \\ 9 \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ -5 \\ -1 \end{bmatrix}$

12. $\begin{bmatrix} 2 & -1 & 4 \\ 6 & -3 & -6 \\ 6 & 2 & 0 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -14 \\ 30 \\ -24 \end{bmatrix}$

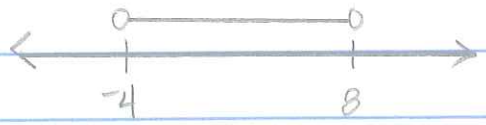
$\begin{bmatrix} 2 & -1 & 4 \\ 6 & -3 & -6 \\ 6 & 2 & 0 \end{bmatrix}^{-1} \cdot \begin{bmatrix} -14 \\ 30 \\ -24 \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -2 \\ -6 \\ -4 \end{bmatrix}$

EOC Practice -

1. $|x-2| < 6$

$x-2 < 6$ $\quad x-2 > -6$

$x < 8$ $\quad x > -4$



$-4 < x < 8$

B.

3. $-12 < x+4 \leq 15$

$-4 \quad -4 \quad -4$

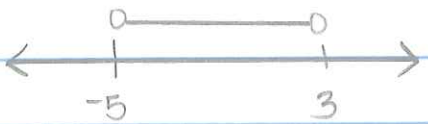
$-16 < x \leq 11$

A.

5. $|x+1| < 4$

$x+1 < 4$ $\quad x+1 > -4$

$x < 3$ $\quad x > -5$



C.

2. $-16 < x - 3 < 14$

$+3 \quad +3 \quad +3$

$-13 < x < 17$

B.

4. $|x - 5| < 3$ C.

Distance from 5 is less than 3.

6. $t \leq 60$ at most 60 min

$t \geq 40$ and $d \geq 10$ at least 40 min at least 10 pts difference

$40 \leq t \leq 60$ and $d \geq 10$ B.

7. $\begin{bmatrix} 3 & 4 & 1 \\ 1 & -6 & 2 \\ \frac{1}{2} & -2 & \frac{1}{3} \end{bmatrix} \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 5 \\ 14 \\ 4 \end{bmatrix}$

$\begin{bmatrix} 3 & 4 & 1 \\ 1 & -6 & 2 \\ \frac{1}{2} & -2 & \frac{1}{3} \end{bmatrix}^{-1} \begin{bmatrix} 5 \\ 14 \\ 4 \end{bmatrix} = \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 2 \\ -1 \\ 3 \end{bmatrix}$ A.

8. $\begin{bmatrix} 2 & 1 & 0 \\ 3 & 0 & -1 \\ 1 & -1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 4 \\ 2 \end{bmatrix}$

$\begin{bmatrix} 2 & 1 & 0 \\ 3 & 0 & -1 \\ 1 & -1 & 1 \end{bmatrix}^{-1} \begin{bmatrix} 0 \\ 4 \\ 2 \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ -2 \\ -1 \end{bmatrix}$ B.

$y = -2$

10. $|x-3| \geq 2$ ← distance from 3

$x-3 \geq 2$ | $x-3 \leq -2$

$+3 \quad +3$ | $+3 \quad +3$

$x \geq 5$ | $x \leq 1$

D.

EOC Practice - Matrices

1. $A = 3 \times 2$

$B = 3 \times 3$

$C = 2 \times 3$

$A \times C \times B$

$(3 \times \underline{2}) \cdot (\underline{2} \times 3) \cdot (3 \times 3)$

$3 \times \underline{3} \cdot \underline{3} \times 3$

$= 3 \times 3$

A.

2. $\underset{1 \times 3}{[\$1.00 \quad \$3.00 \quad \$4.00]} \begin{bmatrix} 37 \\ 52 \\ 42 \end{bmatrix}_{3 \times 1} = \$361$

C. Doesn't work because if you multiply a $3 \times 1 \cdot 1 \times 3$ you get a 3×3. This would give you 9 answers, not 1. B & D are not possible because you can't multiply them.

3. $\begin{vmatrix} 4 & 9 \\ 3 & -6 \end{vmatrix}$

$2^{nd} \rightarrow x^{-1}$ (Matrix) $\rightarrow$ Math $\rightarrow$ det

$\det\left(\begin{bmatrix} 4 & 9 \\ 3 & -6 \end{bmatrix}\right) = -51$

A.

4. Multiply on calc.

$$\begin{bmatrix} -3 & 1 \\ 6 & 0 \\ 4 & 2 \\ 9 & 7 \end{bmatrix} \cdot \begin{bmatrix} 2 & 6 \\ 5 & 1 \end{bmatrix} = \begin{bmatrix} -1 & -17 \\ 12 & 36 \\ 18 & 26 \\ 53 & 61 \end{bmatrix}$$ B.

5. $$\begin{bmatrix} 3 & 2 \\ 4 & 1 \end{bmatrix}^{-1} = \begin{bmatrix} -\frac{1}{5} & \frac{2}{5} \\ \frac{4}{5} & -\frac{3}{5} \end{bmatrix}$$ D.

↑ on calc.

6. $15,000\,(0.06) + 5,000\,(0.04)$

$900 + 200 = \$1,100$ A.

7. $$\begin{vmatrix} 2 & 1 & 4 \\ 0 & 0 & 5 \\ 3 & -3 & 2 \end{vmatrix}$$

$2^{nd} \rightarrow x^{-1}$ (Matrix) $\rightarrow$ Math $\rightarrow$ det(

$$\det\left(\begin{bmatrix} 2 & 1 & 4 \\ 0 & 0 & 5 \\ 3 & -3 & 2 \end{bmatrix}\right) = 45$$ D.

8. $$A \cdot B = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} \cdot \begin{bmatrix} 6 & 0 & -3 \end{bmatrix} = \begin{bmatrix} 6 & 0 & -3 \\ 12 & 0 & -6 \\ 18 & 0 & -9 \end{bmatrix}$$ D.

$3 \times y$ $\quad$ 1×3 $\quad$ 3×3

9. $\begin{bmatrix} \frac{1}{5} & \frac{3}{10} \\ \frac{2}{5} & \frac{1}{10} \end{bmatrix}^{-1} = \begin{bmatrix} -1 & 3 \\ 4 & -2 \end{bmatrix}$ D.

$X = -1$

10. Only square matrices can have inverses. So we just have to check

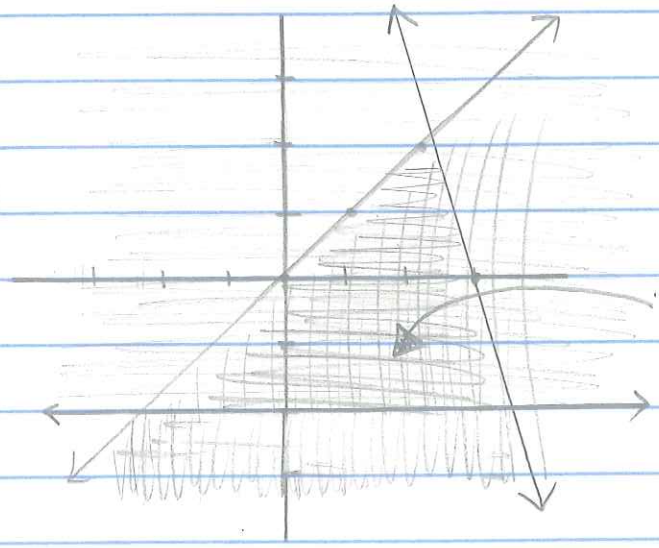
$$\begin{bmatrix} 4 & -1 \\ 3 & 1 \end{bmatrix}^{-1} = \begin{bmatrix} \frac{1}{7} & \frac{1}{7} \\ -\frac{3}{7} & \frac{4}{7} \end{bmatrix}$$

$$\begin{bmatrix} 7 & -1 \\ -14 & 2 \end{bmatrix}^{-1} = \text{Error} = \text{No inverse}$$

So only $\begin{bmatrix} 4 & -1 \\ 3 & 1 \end{bmatrix}$ has an inverse

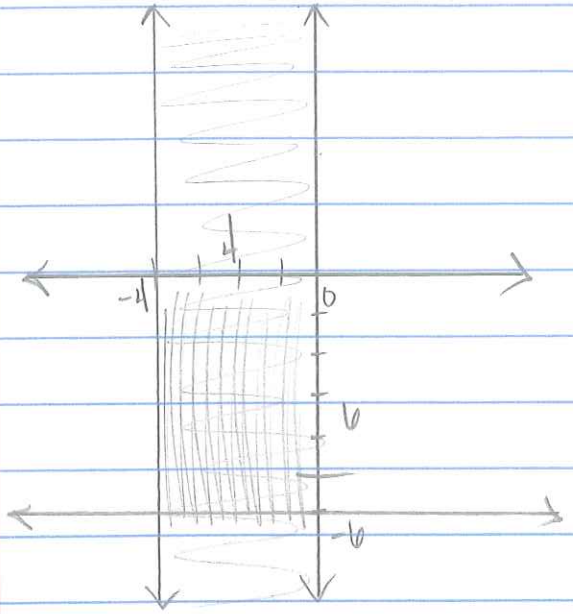
EOC Practice - Systems, Inequalities & LP

1. $y \leq x$
$y \geq -3$
$y \leq 15 - 5x$



All shading overlaps in center Δ C.

2.



$-4 \leq x \leq 0$

$x=-4 \quad x=0$ ← shade between

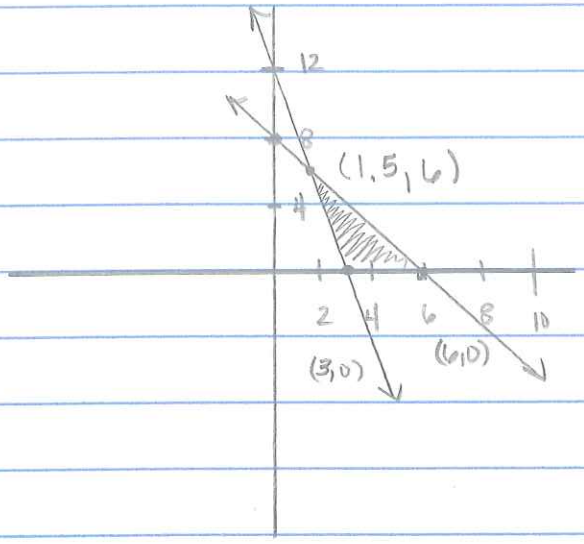
$-6 \leq y \leq 0$

$y=-6 \quad y=0$ ← shade between

$6 \times 4 = 24$ C.

3. C. Just check shading on calc.

4.



$4x + y \geq 12$

$y \geq -4x + 12$

$4x + 3y \leq 24$

$3y \leq -4x + 24$

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

Plug in $(1.5, 6)$, $(3,0)$, $(6,0)$ } into $2x + 3y$

$2(1.5) + 3(6) = 21$ ★ biggest D.

$2(3) + 3(0) = 6$

$2(6) + 3(0) = 12$

5. $x + 2y \leq 6$

$2y \leq -x + 6$

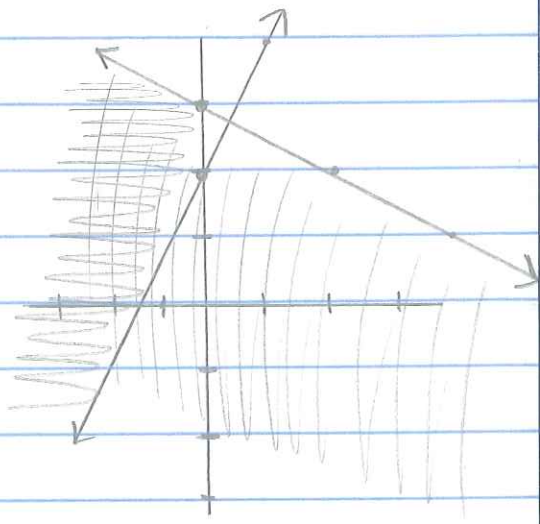
$y \leq -\frac{1}{2}x + 3$ ← shade below

$2x - y < -2$

$-y < -2x - 2$

$y > 2x + 2$ ← shade above

B.

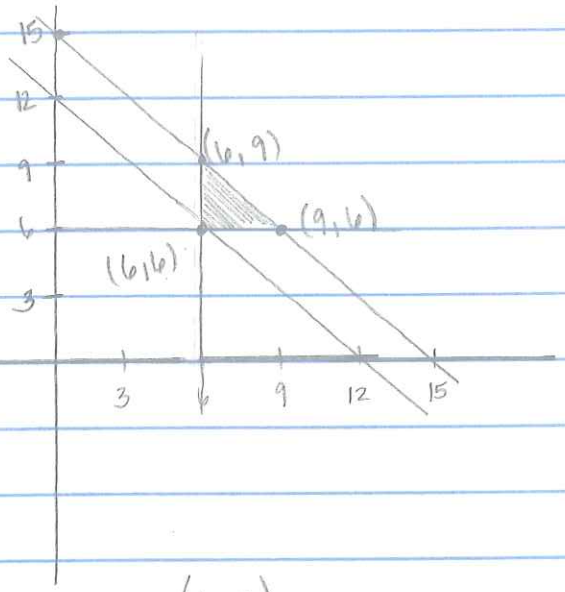


6. $x + y \geq 12$ $\quad x \geq 6$ $\quad$ Profit: $0.19x + 0.20y$

$x + y \leq 15$ $\quad y \geq 6$

$y \geq -x + 12$

$y \geq -x + 15$



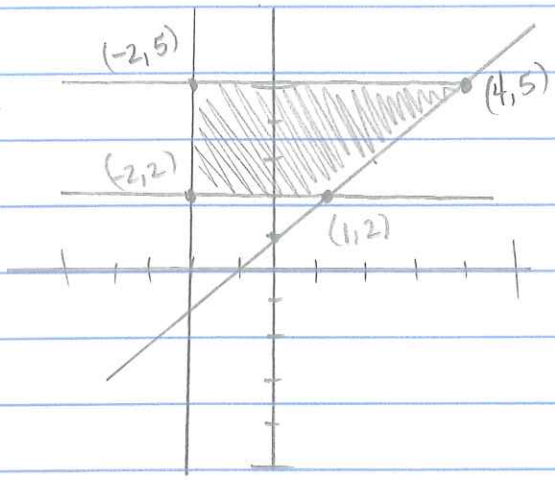
Plug in (6,9), (6,6), (9,6) } to Profit equation

★ @ (6,9) → .19(6) + .20(9) = $2.94 $\quad$ (6,9)

@ (6,6) → .19(6) + .20(6) = $2.34 $\quad$ B. 6 cherry & 9 carmel

@ (9,6) → .19(9) + .20(6) = $2.91

7.



$x \geq -2$

$2 \leq y \leq 5$ ← between 2 & 5

$y \geq x + 1$

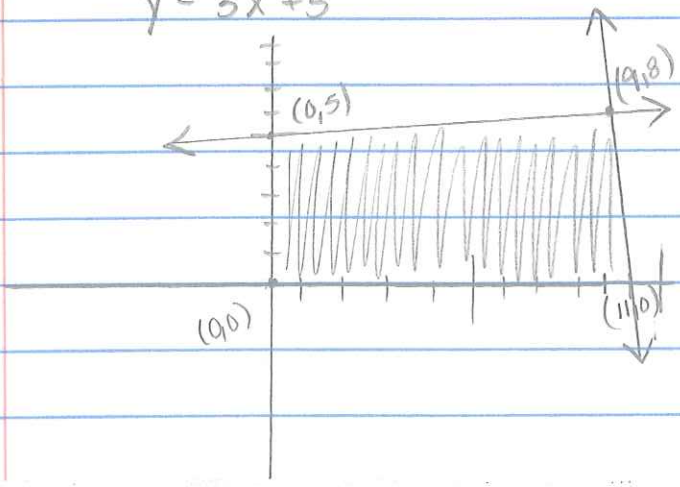
Plug (-2,5) to $2x - 3y$
(-2,2)
(4,5)
(1,2)

@ (-2,5) $2(-2) - 3(5) = -19$ ← Min C.
@ (-2,2) $2(-2) - 3(2) = -10$
@ (4,5) $2(4) - 3(5) = -7$
@ (1,2) $2(1) - 3(2) = -4$ ← Max

8. $-x + 3y \leq 15$ $4x + y \leq 44$

$3y \leq x + 15$ $y \leq -4x + 44$

$y \leq \frac{1}{3}x + 5$



She needs to evaluate at (0,0)
(11,0)
(9,8)
(0,5)