Review Answers

1. a) $5(2x+4y=2) \rightarrow 10x+20y=10$

$-2(5x-3y=18) \rightarrow -10x+6y=-36$

$26y=-26$

$y=\frac{-26}{26}$

$y=-1$

$2x+4y=2$

$2x+4(-1)=2$

$2x-4=2$

$2x=6$

$x=3$

b) $2x-3y=-5z-10 \rightarrow 2x-3y+5z=-10$

$5x-4z=36-2y \rightarrow 5x+2y-4z=36$

$7x-2y+2z=-18 \rightarrow 7x-2y+2z=-18$

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[A]^-1[B]
          [[10]
           [95]
           [51]]
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$$\begin{bmatrix} 2 & -3 & 5 \\ 5 & 2 & -4 \\ 7 & -2 & 2 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix}=\begin{bmatrix} -10 \\ 36 \\ -18 \end{bmatrix}$$

$AX=B$

$X=A^{-1}B$

$$X=\begin{bmatrix} 10 \\ 95 \\ 51 \end{bmatrix}$$

$x=10$

$y=95$

$z=51$

2. a) $\frac{5(x-4)}{1}=\frac{2x-1}{3}+\frac{7}{1}$

$\frac{5(x-4)}{1}=\frac{2x-1}{3}+\frac{21}{3}$

$\frac{5x-20}{1}=\frac{2x-1+21}{3}$

$15x-60=2x+20$

$13x=80$

$x=\frac{80}{13}$

b) $3x-4(x+2)=15-2x$

$3x-4x-8=15-2x$

$+2x \quad +8 \quad +8 \quad +2x$

$-x-8=15-2x$

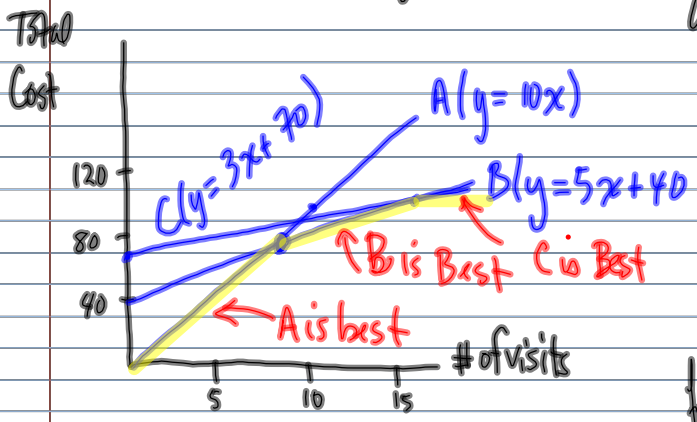
$x=23$

3 (A) Flab is Fab $y = 10x$ Where x is the # of visits
(B) Heart Smart $y = 5x + 40$ y is the total cost
(C) Firm + Fit $y = 3x + 70$

A + B
$10x = 5x + 40$
$5x = 40$
$x = 8$
$(y = 80)$

A + C
$10x = 3x + 70$
$7x = 70$
$x = 10$
$(y = 100)$

B + C
$5x + 40 = 3x + 70$
$2x = 30$
$x = 15$
$(y = 115)$



A is best for up to 8 visits. B is best for between 8 and 15 visits. C is best for more than 15 visits

4. August: $75c + 80m + 1200l = 41.50$
Sept: $200c + 100m + 600l = 62.00$
Oct: $250c + 150m + 800l = 83.00$

$$\begin{bmatrix} 75 & 80 & 1200 \\ 200 & 100 & 600 \\ 250 & 150 & 800 \end{bmatrix} \begin{bmatrix} c \\ m \\ l \end{bmatrix} = \begin{bmatrix} 41.50 \\ 62.00 \\ 83.00 \end{bmatrix}$$

$AX = B$

$X = A^{-1}B$

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[A]^-1[B]
          [[.18]
           [.2 ]
           [.01]]
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$$\begin{bmatrix} c \\ m \\ l \end{bmatrix} = \begin{bmatrix} 0.18 \\ 0.2 \\ 0.01 \end{bmatrix}$$

So calls to Canada are 18¢ per minute, 20¢ per minute to US and 1¢ per minute to

5. Let x be the # of hours of exercise
y be the total calories.

$(4, 15600)$

a) slope = 225 calories/h

slope: $\frac{225}{1}$ $\quad +1 \rightarrow +225$

$(4, 15600)$
$(5, 15825)$

b) $y = mx + b$

$15600 = 225(4) + b$

$15600 = 900 + b$

$b = 14700$

$y = 225x + 14700$

c) y-intercept is 14700 calories. It is how many calories the average teenage boy would need a week with no exercise.

d) x-intercept: (let $y = 0$)

$y = 225x + 14700$

$0 = 225x + 14700$

$-14700 = 225x$

$x = -65\text{ h}$

It has no meaning.... it would be the time needed to exercise and use no calories each week.

e) $y = 225x + 14700$

$y = 225(18) + 14700$

$y = 18750$ calories

f) $y = 225x + 14700$

$(2500)(7) = 225x + 14700$

daily each week!

$17500 = 225x + 14700$

$2800 = 225x$

$x = 12.4\text{ h}$

6. a) Supply: (70, 300) and (80, 450) where x is the price and y is the supply/demand.

slope: $m = \frac{450-300}{80-70}$ $y = mx + b$

$m = \frac{150}{10}$ $300 = 15(70) + b$

$m = 15$ $300 = 1050 + b$

$b = -700$

$\boxed{y = 15x - 700}$ Supply equation

demand: (70, 1000) (80, 900)

$m = \frac{900-1000}{80-70}$ $y = mx + b$

$m = \frac{-100}{10}$ $1000 = (-10)(70) + b$

$m = -10$ $1000 = -700 + b$

$b = 1700$

$\boxed{y = -10x + 1700}$ demand equation.

b) at equilibrium:

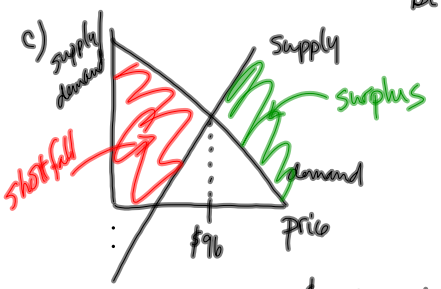
supply = demand

$15x - 700 = -10x + 1700$

$25x = 2400$

$\boxed{x = 96}$ ← so the price should be $96

c)



for a price of $95 there is a shortfall

d) ↳ supply = 0 (eliminated)

$y = 15x - 700$

$0 = 15x - 700$

$700 = 15x$

$\boxed{x = \$46.67}$

e) If given away ($x = 0$):

$y = -10x + 1700$

$y = -10(0) + 1700$

$\boxed{y = 1700}$ ← basically the y-int.

10. $3z + 2y + x = 6$

x-intercept

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

$\boxed{x = 6}$

y-intercept

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

$2y = 6$

$\boxed{y = 3}$

z-intercept

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

$3z = 6$

$\boxed{z = 2}$