

①  $\left[ \begin{array}{ccc|c} 1 & 0 & -2 & 0 \\ 0 & 1 & 1 & -3 \\ 0 & 0 & 0 & 4 \end{array} \right]$  Yes. Note there is no solution

②

	Dad	mom	Baby		\$
Horse	15	12	22	Dad	7
Dog				Mom	6
cat				Baby	4
	F				= R
				G	

③  $2X + D = XB \Rightarrow D = XB - 2X = X(B - 2I)$   
 $D = X(B - 2I) \Rightarrow D(B - 2I)^{-1} = X(B - 2I)(B - 2I)^{-1} = XI$   
 $X = D(B - 2I)^{-1}$

④  $\text{COST} = C(x) = cx + 92,500$   
 $\text{Rev} = 130x$   
 $P = R - C = 130x - (cx + 92,500) = (130 - c)x - 92,500$   
 $P(12000) = 795,500 = (130 - c)(12000) - 92,500$   
 $\Rightarrow 888,000 = 1,560,000 - 12000c$   
 $12000c = 672,000 \Rightarrow c = 56$

a)  $C(x) = 56x + 92,500 \Rightarrow$  cost in \$,  $x$  # of drills

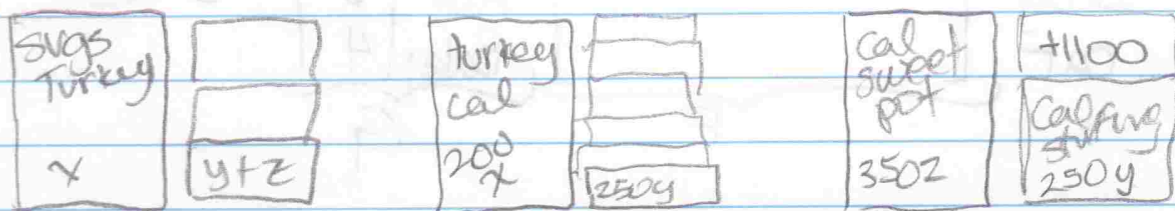
b)  $P = 0$  or  $R = C \Rightarrow 130x = 56x + 92,500$

$x = 1250$  drills,  $R = 1250 \times 130 = \$162,500$

(5)  $X = (I - A)^{-1} D$  for I-O economies,  $D = \begin{pmatrix} 1500 \\ 6500 \\ 4000 \end{pmatrix}$

$$X = \begin{pmatrix} 1269.363 \dots \\ 16127.366 \dots \\ 10189.329 \dots \end{pmatrix}$$

(6)  $x = \# \text{ of servings of turkey}$  }  $x = 3(y+z)$  <sup>svg ratio</sup>  
 $y = \dots$  }  $200x = 6(250y)$  <sup>cal ratio</sup>  
 $z = \dots$  }  $350z = 250y + 1100$  <sup>sw. pot.</sup>



(if  $x, y, z$  in cal,  $x/200 = 3(y/250 + z/350)$ ,  $1/6x = y$ ,  $z = y + 1100$ )

(7) A:  $s=0, t=0 \Rightarrow x=-7, y=1$  ✓  
 B:  $s=0, t=1 \Rightarrow x=-4, y=1$  ✓  
 C:  $s=1, t=0 \Rightarrow x=-7, y=-1$  NO  
 D:  $s=1, t=1 \Rightarrow x=-4, y=-1$  ✓

(8) A:  $S(0) = 1.1 \Rightarrow \$1.10$   
 B:  $\varphi = \varphi$  or graph or RREF  $\Rightarrow x=30, y=3.5$   
 A total of 30 cartons are <sup>produced</sup> sold at a price of  $\$3.50$  each

9.

$x = \# \text{ of Celtic rings}$   
 $y = \# \text{ of Roman rings}$   
 $z = \# \text{ of Greek rings}$

$$3x + 1y + 6z = 27 \text{ gm white}$$

$$2x + 1y + 3z = 18 \text{ gm yellow}$$

$$\left[ \begin{array}{ccc|c} 3 & 1 & 6 & 27 \\ 2 & 1 & 3 & 18 \end{array} \right] \xrightarrow{\text{ref}} \left[ \begin{array}{ccc|c} 1 & 0 & 3 & 9 \\ 0 & 1 & -3 & 0 \end{array} \right] \begin{array}{l} x + 3z = 9 \\ y - 3z = 0 \end{array}$$

$$(x, y, z) = (9 - 3t, 3t, t) \quad t = \# \text{ of greek rings}$$

$$t = 0 \Rightarrow (9, 0, 0) \text{ make ...}$$

$$t = 1 \Rightarrow (6, 3, 1)$$

$$t = 2 \Rightarrow (3, 6, 2)$$

$$t = 3 \Rightarrow (0, 9, 3)$$

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	challenge	mod	easy
hard	5	3	2
little	2	4	1
none	-1	1	0

- a) optimist  $\Rightarrow$  study hard & expect challenging  
 b) pessimist  $\Rightarrow$  study hard at worst get 20  
 c)  $E = (2)(.25) + 4(.5) + 1(.25) = 2.75$

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$$\text{Bill} \begin{array}{c} \# \\ + \\ - \end{array} \begin{array}{c} \text{Sue} \\ + \\ - \end{array} \left( \begin{array}{cc} 2 & -2 \\ -2 & 2 \end{array} \right)$$