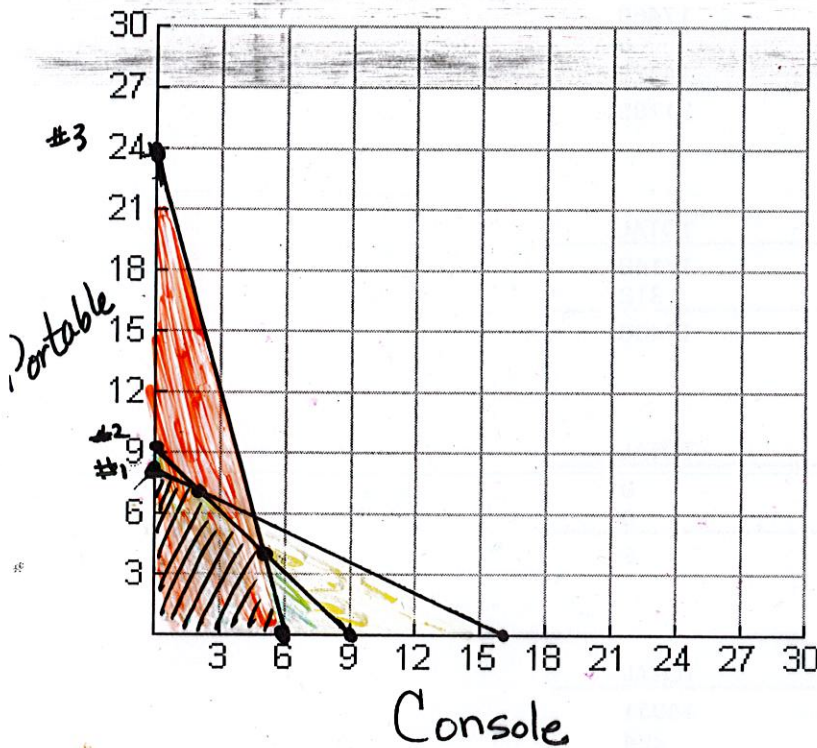


A small TV manufacturing company produces console and portable TV's using three different machines, A, B, and C. In order to make a console TV, an hour on machine A, an hour on machine B and four hours on machine C are needed. In order to make a portable TV, two hours on machine A, one hour on machine B and one hour on machine C are needed. Machine A is only available for 16 hours per day, machine B is only available for 9 hours per day, and machine C is available for 24 hours per day. The company makes \$60 in profit on a console TV and \$40 in profit on a portable TV. How many of each type of TV should they make to maximize their profits?



Let C = console
P = portable

	A	B	C
Console	1	1	4
Portable	2	1	1
	16	9	24

$$1C + 2P \leq 16 \quad (\text{Line \#1})$$

$$1C + 1P \leq 9 \quad (\text{Line \#2})$$

$$4C + 1P \leq 24$$

$$P = 60C + 40P$$

$$(0, 8) = \$320$$

$$(2, 7) = \$400$$

$$(5, 4) = \$460$$

$$(6, 0) = \$360$$

Line 1 + Line 2

$$\begin{bmatrix} 1 & 2 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} C \\ P \end{bmatrix} = \begin{bmatrix} 16 \\ 9 \end{bmatrix}$$

$$[A]^{-1}[A] \begin{bmatrix} C \\ P \end{bmatrix} = [A]^{-1}[B]$$

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} C \\ P \end{bmatrix} = \begin{bmatrix} 2 \\ 7 \end{bmatrix}$$

Line 2 + Line 3

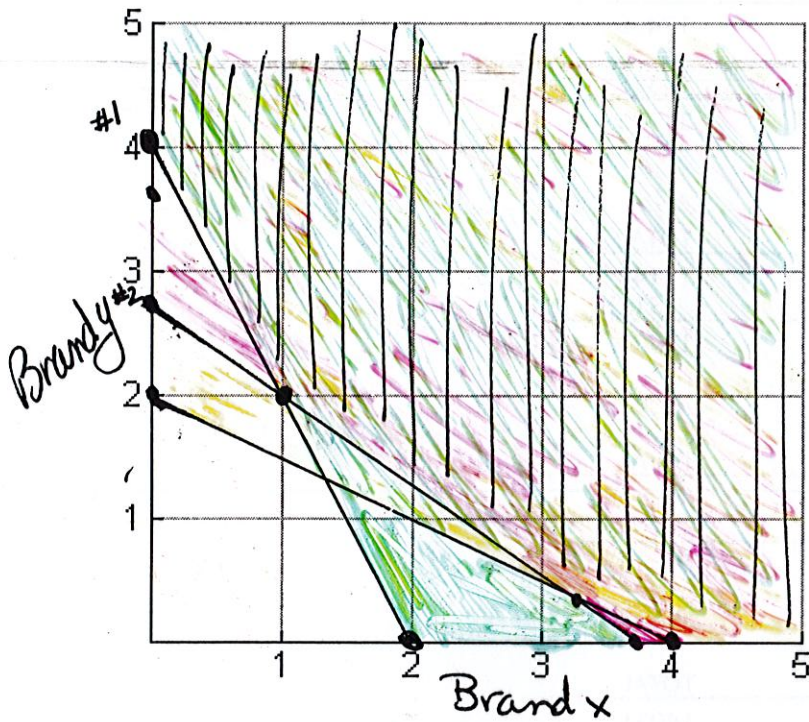
$$\begin{bmatrix} 1 & 1 \\ 4 & 1 \end{bmatrix} \begin{bmatrix} C \\ P \end{bmatrix} = \begin{bmatrix} 9 \\ 24 \end{bmatrix}$$

$$[A]^{-1}[A] \begin{bmatrix} C \\ P \end{bmatrix} = [A]^{-1}[B]$$

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} C \\ P \end{bmatrix} = \begin{bmatrix} 5 \\ 4 \end{bmatrix}$$

make 5 console TV's
4 portable TV's

Every day Rhonda Miler needs a dietary supplement of 4 mg of vitamin A, 11 of vitamin B and 100 mg of vitamin C. Either of two brands of vitamin pills can be used: Brand X at \$.06 a pill or Brand Y at \$.08 a pill. A brand X pill supplies 2mg of vitamin A, 3 mg of vitamin B, and 25 mg of vitamin C. Like wise, a Brand Y pill supplies 1 mg of vitamin A, 4 mg of vitamin B, and 50 mg of Vitamin C. How many pills of each brand should she take each day in order to satisfy the minimum daily need most economically?



Let $x = \text{Brand } x$
 $y = \text{Brandy}$

	A	B	C
Brand x	2	3	25
Brandy	1	4	50
	4	11	100

$$2x + 1y \geq 4 \quad (\text{Line \#1})$$

$$3x + 4y \geq 11$$

$$25x + 50y \geq 100$$

$$C = 0.06x + 0.08y$$

$$(0, 4) = \$.32$$

$$(1, 2) = \$.22$$

$$(3, 0.5) = \$.22$$

$$(4, 0) = \$.24$$

Either 1 of x
 2 of y

or

3 of x
 1/2 of y

Line 1 + Line 2

$$\begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 4 \\ 11 \end{bmatrix}$$

$$[A]^{-1}[A] \begin{bmatrix} x \\ y \end{bmatrix} = [A]^{-1}[B]$$

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$$

Line 2 + Line 3

$$\begin{bmatrix} 3 & 4 \\ 25 & 50 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 11 \\ 100 \end{bmatrix}$$

$$[A]^{-1}[A] \begin{bmatrix} x \\ y \end{bmatrix} = [A]^{-1}[B]$$

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 0.5 \end{bmatrix}$$