

①

$$\begin{aligned}
 p &= p \\
 -0.03q + 41.9 &= 0.012q + 21.74 \\
 20.16 &= 0.042q \\
 q &= 480
 \end{aligned}$$

$$\begin{aligned}
 q = 480 \rightarrow p &= 0.012q + 21.74 \\
 p &= 0.012(480) + 21.74 \\
 p &= 27.5
 \end{aligned}$$

Equilibrium quantity : 480,000
 " price : \$27.50

②

$$\begin{aligned}
 (x_1, y_1) &= (250, 86450) \\
 (x_2, y_2) &= (675, 224575)
 \end{aligned}$$

$$\begin{aligned}
 m &= \frac{y_2 - y_1}{x_2 - x_1} \\
 &= \frac{224575 - 86450}{675 - 250} \\
 &= \frac{138125}{425} \\
 &= 325
 \end{aligned}$$

$$y = mx + b$$

$$y = 325x + b$$

Sub $y = 86450$: $86450 = 325(250) + b$
 $x = 250$ $b = 5200$

$$y = 325x + 5200$$

③

	(x) Surfboard	(y) Paddleboards	Available
Manufacture	6	12	102
Dye	2	3	30
Profit	52	88	///

a) Daily Profit = $52x + 88y$

b) $6x + 12y \leq 102$

$2x + 3y \leq 30$

$x \geq 0$

$y \geq 0$

c)	Vertex	$52x + 88y$
	$(0, 0)$	0
	$(0, 8.5)$	748
	$(15, 0)$	780
	$(9, 4)$	820

Maximum daily profit = \$820

④

$$\left[\begin{array}{ccc|c} 2 & 8 & 4 & 28 \\ 3 & 3 & 6 & 15 \\ 13 & 25 & 26 & 101 \end{array} \right]$$

$$\frac{R_1}{2} \left[\begin{array}{ccc|c} \textcircled{1} & 4 & 2 & 14 \\ 3 & 3 & 6 & 15 \\ 13 & 25 & 26 & 101 \end{array} \right]$$

$$\begin{array}{l} R_2 - 3R_1 \\ R_3 - 13R_1 \end{array} \left[\begin{array}{ccc|c} 1 & 4 & 2 & 14 \\ 0 & -9 & 0 & -27 \\ 0 & -27 & 0 & -81 \end{array} \right]$$

$$\frac{R_2}{-9} \left[\begin{array}{ccc|c} 1 & 4 & 2 & 14 \\ 0 & \textcircled{1} & 0 & 3 \\ 0 & -27 & 0 & -81 \end{array} \right]$$

$$\begin{array}{l} R_1 - 4R_2 \\ R_3 + 27R_2 \end{array} \left[\begin{array}{ccc|c} x & y & z & \\ \textcircled{1} & 0 & 2 & 2 \\ 0 & \textcircled{1} & 0 & 3 \\ 0 & 0 & 0 & 0 \end{array} \right]$$

$$x + 2z = 2$$

$z = \text{any value}$
$x = 2 - 2z$
$y = 3$

(5) AB is undefined

$$BA = \begin{bmatrix} 1 & -2 \\ 7 & 3 \end{bmatrix} \begin{bmatrix} 2 & -3 & 4 \\ -4 & 2 & 6 \end{bmatrix}$$

$$= \begin{bmatrix} 10 & -7 & -8 \\ 2 & -15 & 46 \end{bmatrix}$$