(37) Given line: $4x-5y=3$

$$-5y = 3-4x$$

$$y = \frac{3}{-5} - \frac{4x}{-5}$$

$$y = \frac{-3}{5} + \frac{4}{5}x$$

$$y = \frac{4}{5}x - \frac{3}{5}$$

$$m = \frac{4}{5}$$

Desired line has $m = \frac{4}{5}$ (lines are parallel)

Desired line: $y = mx+b$

$$\boxed{y = \frac{4}{5}x + b}$$

Sub $y=4$, $x=-8$: $4 = \frac{4}{5}(-8) + b$

$$\frac{20}{5} = \frac{-32}{5} + b$$

$$\frac{20}{5} + \frac{32}{5} = b$$

$$b = \frac{52}{5}$$

$$y = \frac{4}{5}x + \frac{52}{5}$$

(38)

| | (x) Hockey Pucks | (y) Soccer Balls | Available |
|---|---|---|---|
| Manufacturing (Hours) | 5 | 2 | 40 |
| Testing (Hours) | 1 | 2 | 20 |

$5x + 2y \leq 40$

$x + 2y \leq 20$

$x \geq 0$

$y \geq 0$

} cannot make a negative # of hockey pucks or soccer balls

(39)

| Vertices | $5x+6y$ |
|---|---|
| $(0,0)$ | 0 |
| $(5,0)$ | 25 |
| $(0,4)$ | 24 |
| $(2,3)$ | 28 |

The maximum value is 28
and it occurs at the point $(2,3)$.

(40)

$$\begin{array}{c} \\ R_2-2R_1 \\ R_3-R_1 \end{array}\left[\begin{array}{ccc|c} x & y & z & \# \\ 1 & 2 & -1 & 3 \\ 2 & 4 & -2 & 6 \\ 1 & -1 & 2 & 0 \end{array}\right] \quad \left[\begin{array}{ccc|c} 1 & 2 & -1 & 3 \\ 0 & 0 & 0 & 0 \\ 0 & -3 & 3 & -3 \end{array}\right]$$

$$R_2 \Leftrightarrow R_3 \quad \left[\begin{array}{ccc|c} 1 & 2 & -1 & 3 \\ 0 & -3 & 3 & -3 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

$$\frac{R_2}{-3} \quad \left[\begin{array}{ccc|c} 1 & 2 & -1 & 3 \\ 0 & 1 & -1 & 1 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

$$R_1-2R_2 \quad \left[\begin{array}{ccc|c} 1 & 0 & 1 & 1 \\ 0 & 1 & -1 & 1 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

$z$ = any value

$x + z = 1 \Rightarrow x = 1 - z$

$y - z = 1 \Rightarrow y = 1 + z$