

System Applications WS

1. $a = \# \text{ of } 2\text{-pointers}$ $\begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 7 \\ 2 \end{bmatrix}$
 $b = \# \text{ of } 3\text{-pointers}$

$$\begin{aligned} a + b &= 9 \\ 2a + 3b &= 20 \end{aligned} \quad \begin{bmatrix} 1 & 1 \\ 2 & 3 \end{bmatrix} \begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 9 \\ 20 \end{bmatrix}$$

2. $a = \# \text{ pkgs } < 3\text{lbs.}$ $\begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 7 \\ 5 \end{bmatrix}$
 $b = \# \text{ pkgs } \geq 3\text{lbs}$

$$\begin{aligned} a + b &= 12 \\ 2a + 3b &= 29 \end{aligned} \quad \begin{bmatrix} 1 & 1 \\ 2 & 3 \end{bmatrix} \begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 12 \\ 29 \end{bmatrix}$$

3. $b = \# \text{ hrs babysitting}$ $\begin{bmatrix} b \\ r \end{bmatrix} = \begin{bmatrix} 5 \\ 6 \end{bmatrix}$
 $r = \# \text{ hrs @ restaurant}$

$$\begin{aligned} 8b + 3r &= 58 \\ 2b + 5r &= 40 \end{aligned} \quad \begin{bmatrix} 8 & 3 \\ 2 & 5 \end{bmatrix} \begin{bmatrix} b \\ r \end{bmatrix} = \begin{bmatrix} 58 \\ 40 \end{bmatrix}$$

4. $h = \# \text{ of hours}$ $\begin{bmatrix} h \\ c \end{bmatrix} = \begin{bmatrix} 2 \\ 11 \end{bmatrix}$
 $c = \text{cost}$

omit

$$\begin{aligned} c &= 7 + 2h \rightarrow 2h - c = -7 \\ c &= 5 + 3h \rightarrow 3h - c = -5 \end{aligned} \quad \begin{bmatrix} 2 & -1 \\ 3 & -1 \end{bmatrix} \begin{bmatrix} h \\ c \end{bmatrix} = \begin{bmatrix} -7 \\ -5 \end{bmatrix}$$

5. $a = \# \text{ ml } 1\% \text{ solution}$ $\begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 70 \\ 20 \end{bmatrix}$
 $b = \# \text{ ml } 10\% \text{ solution}$

$$\begin{aligned} a + b &= 90 \\ .01a + .1b &= .03(90) \end{aligned} \quad \begin{bmatrix} 1 & 1 \\ .01 & .1 \end{bmatrix} \begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 90 \\ 2.7 \end{bmatrix}$$

6. $a = \# \text{ drums type 1 } (\$30)$ $\begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 7 \\ 160 \end{bmatrix}$
 $b = \# \text{ drums type 2 } (\$20)$

$$a + b = 7$$

$$30a + 20b = 160$$

$$\begin{bmatrix} 1 & 1 \\ 30 & 20 \end{bmatrix} \begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 7 \\ 160 \end{bmatrix}$$

* 7. $2l + 2w = 86 \rightarrow 2l + 2w = 86$ $\begin{bmatrix} 2 & 2 \\ -1 & 2 \end{bmatrix} \begin{bmatrix} l \\ w \end{bmatrix} = \begin{bmatrix} 86 \\ 2 \end{bmatrix}$
 $2w = l + 2 \rightarrow -l + 2w = 2$

$$\begin{bmatrix} l \\ w \end{bmatrix} = \begin{bmatrix} 28 \\ 15 \end{bmatrix}$$

8. $x = \# \text{ memb. ordering one}$ $\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 880 \\ 9840 \end{bmatrix}$
 $y = \# \text{ memb. ordering two}$

$$x + 2y = 880$$

$$12x + 20y = 9840$$

$$\begin{bmatrix} 1 & 2 \\ 12 & 20 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 880 \\ 9840 \end{bmatrix}$$

* 9. $c = \# \text{ of cars}$ $\begin{bmatrix} c \\ t \end{bmatrix} = \begin{bmatrix} 1000 \\ 4200 \end{bmatrix}$
 $t = \# \text{ of trucks}$

$$t = 4c \rightarrow 4c - t = 0$$

$$5c + 6t = 29000$$

$$\begin{bmatrix} 4 & -1 \\ 5 & 6 \end{bmatrix} \begin{bmatrix} c \\ t \end{bmatrix} = \begin{bmatrix} 0 \\ 29000 \end{bmatrix}$$

10. $S = \# \text{ acres of soybeans}$ $\begin{bmatrix} S \\ C \end{bmatrix} = \begin{bmatrix} 100 \\ 660 \end{bmatrix}$
 $C = \# \text{ acres of corn}$

$$S + C = 100$$

$$6S + 8C = 660$$

$$\begin{bmatrix} 1 & 1 \\ 6 & 8 \end{bmatrix} \begin{bmatrix} S \\ C \end{bmatrix} = \begin{bmatrix} 100 \\ 660 \end{bmatrix}$$