2.3.7

a. it's $n \times n$ matrix

c. 3×5

$$\begin{matrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{matrix} \quad \begin{matrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{matrix}$$

2.3.8

a. $\begin{bmatrix} -1 & -1 \\ 1 & 1 \end{bmatrix}$ and $\begin{bmatrix} -1 & 1 \\ -1 & 1 \end{bmatrix}$

c. $A = \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$ $B = \begin{bmatrix} 0 & 0 \\ 1 & 0 \end{bmatrix}$

2.3.25

$$\begin{bmatrix} 12 & 2 \\ 21 & 3 \\ 10 & 2 \end{bmatrix} \cdot \begin{bmatrix} 21 & 18 & 20 \\ 14 & 19 & 13 \end{bmatrix}$$

$252+28 \quad 280$

$441+42 = 483$

$210+28 \quad 238$

$216+20 \quad 236$

$378+30 = 408$

$180+20 \quad 200$

$240+26 \quad 266$

$420+39 = 459$

$200+26 \quad 226$

$$AB = \begin{bmatrix} 280 & 236 & 266 \\ 483 & 408 & 459 \\ 238 & \boxed{200} & 226 \end{bmatrix}$$

$AB_{(3,2)} = 200$. 200 is the total cost for plant 2 to assemble & package heads.

D. = 1001

$P_2 = 844$ So Plant 2 is the most
$P_3 = 951$, economical to operate.

Because the sum of the total cost is the lowest at plant 2

2.4.4

a.

$$Ax = \begin{bmatrix} 1 \\ -1 \\ 3 \end{bmatrix} \rightarrow A^{-1}Ax = x$$

$$x = \begin{bmatrix} 1 & -1 & 3 \\ 2 & 0 & 5 \\ -1 & 1 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ -1 \\ 3 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 1 & 9 \\ 2 & 0 & 15 \\ -1 & -1 & 0 \end{bmatrix}$$

c. $CA = \begin{bmatrix} 1 & 2 & -1 \\ 3 & 1 & 1 \end{bmatrix}$

$$CAA^{-1} = C = \begin{bmatrix} 1 & 2 & -1 \\ 3 & 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & -1 & 3 \\ 2 & 0 & 5 \\ -1 & 1 & 0 \end{bmatrix}$$

$1 \quad 4 \quad 1 \quad = 6$

$3 \quad 2 \quad -1 \quad = 4$

$-1 \quad 0 \quad -1 \quad = -2$

$-3 \quad 0 \quad 1 \quad = -2$

$3 \quad 10 \quad 0 \quad = 13$

$9 \quad 5 \quad 0 \quad = 14$

So $C = \begin{bmatrix} 6 & -2 & 13 \\ 4 & -2 & 14 \end{bmatrix}$

2. 4.9

C. Since A^{-1} & B are inv.

then $\det(A^{-1}) \neq 0$, $\det(B) \neq 0$

$\therefore \det(A^{-1}B) = \det(A^{-1})\det(B) \neq 0$

$\therefore A^{-1}B$ is invertible

$(A^{-1}B)^T$ must be invertible $\left((AB)^T = B^T \cdot A^T\right)$
So true.

e. $\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$

But $\det \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$ is 0...

So false.

g. $(A^{-1})^T = (-A)^{-1}$

since $(A^{-1})^T = (A^T)^{-1}$

$(A^T)^{-1} = (-A)^{-1}$ take out inverses

$A^T = -A$.

So it's true.