2.54(a)

1 2.54(a), §1 Asked

Asked: Find the inverse of

$$\begin{pmatrix} 1 & 1 & 2 \\ 1 & 2 & 5 \\ 1 & 3 & 7 \end{pmatrix}$$

2 2.54(a), §2 Solution

Use minors:

$$\begin{pmatrix} 1 & 1 & 2 \\ 1 & 2 & 5 \\ 1 & 3 & 7 \end{pmatrix}^{-1} =$$

$$\frac{1}{\begin{vmatrix} 1 & 1 & 2 \\ 1 & 2 & 5 \\ 1 & 3 & 7 \end{vmatrix}} \begin{pmatrix} \begin{vmatrix} 2 & 5 \\ 3 & 7 \end{vmatrix} & -\begin{vmatrix} 1 & 5 \\ 1 & 7 \end{vmatrix} & \begin{vmatrix} 1 & 2 \\ 1 & 3 \end{vmatrix} \\ -\begin{vmatrix} 1 & 2 \\ 3 & 7 \end{vmatrix} & \begin{vmatrix} 1 & 2 \\ 1 & 7 \end{vmatrix} & -\begin{vmatrix} 1 & 1 \\ 1 & 3 \end{vmatrix} \\ \begin{vmatrix} 1 & 2 \\ 2 & 5 \end{vmatrix} & -\begin{vmatrix} 1 & 2 \\ 1 & 5 \end{vmatrix} & \begin{vmatrix} 1 & 1 \\ 1 & 2 \end{vmatrix} \end{pmatrix}^{T}$$

and since the determinant in the bottom is -1,

$$\begin{pmatrix} 1 & 1 & -1 \\ 2 & -5 & 3 \\ -1 & 2 & -1 \end{pmatrix}$$

A quicker way to find determinants of large matrices will be given in chapter 3.