Homework - June 25
Section 3.2

6. $\begin{vmatrix} 1 & 5 & -3 \\ 3 & -3 & 3 \\ 2 & 13 & -7 \end{vmatrix} = \begin{vmatrix} 1 & 5 & -3 \\ 0 & -18 & 12 \\ 0 & 3 & -1 \end{vmatrix} = \begin{vmatrix} 1 & 5 & -3 \\ 0 & -18 & 12 \\ 0 & 0 & 71 \end{vmatrix} = 1 \cdot -18 \cdot 71 = -1278.$

12. $\begin{vmatrix} -1 & 2 & 3 & 0 \\ 3 & 4 & 3 & 0 \\ 5 & 4 & 6 & 6 \\ 4 & 2 & 4 & 3 \end{vmatrix} = -6 \begin{vmatrix} -1 & 2 & 3 \\ 3 & 4 & 3 \\ 4 & 2 & 4 \end{vmatrix} + 3 \begin{vmatrix} -1 & 2 & 3 \\ 3 & 4 & 3 \\ 5 & 4 & 6 \end{vmatrix} = -6 \begin{vmatrix} -1 & 2 & 3 \\ 0 & 10 & 12 \\ 0 & 10 & 16 \end{vmatrix} +$
$3 \begin{vmatrix} -1 & 2 & 3 \\ 0 & 10 & 12 \\ 0 & 14 & 21 \end{vmatrix} = 6 \begin{vmatrix} -1 & 2 & 3 \\ 0 & 10 & 12 \\ 0 & 0 & 4 \end{vmatrix} + 3 \begin{vmatrix} -1 & 2 & 3 \\ 0 & 10 & 12 \\ 0 & 0 & 42 \end{vmatrix} = -6(40) + 3(420) = 1020.$

22. $\begin{vmatrix} 5 & 0 & -1 \\ 1 & -3 & -2 \\ 0 & 5 & 3 \end{vmatrix} = - \begin{vmatrix} 1 & -3 & -2 \\ 0 & 15 & 9 \\ 0 & 5 & 3 \end{vmatrix} = - \begin{vmatrix} 1 & -3 & -2 \\ 0 & 15 & 9 \\ 0 & 0 & 0 \end{vmatrix} = 0.$ Thus, the matrix is not invertible.