Sect 2.2
Answer key

1. $\begin{bmatrix} 2 & -3 \\ -5/2 & 4 \end{bmatrix}$

2. $\begin{bmatrix} -2 & 1 \\ 7/2 & -3/2 \end{bmatrix}$

3. $\begin{bmatrix} 1 & 1 \\ -7/5 & -8/5 \end{bmatrix}$

4. $\begin{bmatrix} -2 & 1 \\ -7/4 & 3/4 \end{bmatrix}$

5. $x_1 = 7$
   $x_2 = -9$

6. $x_1 = 2$
   $x_2 = -5$

7. (a & b) $\begin{bmatrix} -9 \\ 4 \end{bmatrix}, \begin{bmatrix} 11 \\ -5 \end{bmatrix}, \begin{bmatrix} 6 \\ -2 \end{bmatrix}, \begin{bmatrix} 13 \\ -5 \end{bmatrix}$

8. $AD = I \Rightarrow A^{-1}AD = A^{-1}I$
   $\Rightarrow ID = A^{-1} \Rightarrow D = A^{-1}$

9. a) T
   b) F
   c) F
   d) T
   e) T

10. a) F
    b) T
    c) T
    d) T
    e) F

11. (a) Solution exists b/c let $X = A^{-1}B$
    $\Rightarrow AX = A(A^{-1}B) = IB = B$
    (b) Solution unique
    Let Y be any solution:
    $AY = B$
    $A^{-1}AY = A^{-1}B \Rightarrow Y = A^{-1}B$

12. A invertible $\Rightarrow$ rref(A) = I
    So reff $[A \; B] = [I \; X]$
    now, $A^{-1}A = I$
    $\Rightarrow A^{-1}[A \; B] = [I \; A^{-1}B]$
    we can do this b/c A^{-1} is built from matrices of elementary row operations

13. $AB = AC$
    $\Rightarrow A^{-1}AB = A^{-1}AC$
    $\Rightarrow IB = IC \Rightarrow B = C$
    But in general, no, not true

14. $(B-C)D = 0$
    $(B-C)DD^{-1} = 0 \cdot D^{-1}$
    $(B-C)I = 0$
    $B - C = 0 \Rightarrow B = C$

15. $D = C^{-1}B^{-1}A^{-1}$

18. $A = PBP^{-1}$
    $\Rightarrow P^{-1}A = P^{-1}PBP^{-1}$
    $\Rightarrow P^{-1}AP = IBP^{-1}P$
    $\Rightarrow P^{-1}AP = BI = B$

29. $\begin{bmatrix} -7 & 2 \\ 4 & -1 \end{bmatrix}$

30. $\begin{bmatrix} -7/5 & 2 \\ 4/5 & -1 \end{bmatrix}$

31. $\begin{bmatrix} 8 & 3 \\ 10 & 4 \\ 7/2 & 3/2 \end{bmatrix}$

32. not invertible

35. $\begin{bmatrix} 3 \\ -6 \\ 4 \end{bmatrix}$ found by row reducing $[A \; \vec{e}_3]$

37. $C = \begin{bmatrix} 1 & 1 & -1 \\ -1 & 1 & 0 \end{bmatrix}$