HW 18 SOLUTIONS

MAT 17B

45. $A = \begin{bmatrix} -1 & 1 \\ 2 & 3 \end{bmatrix}$

Check determinant to see if A^{-1} exists.

$(-1)(3) - (2)(1) = -5 \neq 0.$

so inverse exists

46. $B = \begin{bmatrix} 2 & -2 \\ 3 & 2 \end{bmatrix}$

determinant $= (2)(2) - (-2)(3) = 10 \neq 0.$

so inverse exists.

49. $C = \begin{bmatrix} 2 & 4 \\ 3 & 6 \end{bmatrix}$

determinant $= (2)(6) - (3)(4) = 0$

So inverse DOES NOT exist.

50. I_3 is its own inverse!

Recall that $I_3 I_3 = I_3$

and so $I_3 = I_3^{-1}$

53. $\begin{bmatrix} 2 & -1 \\ 1 & 3 \end{bmatrix}$ determinant $= (2)(3) - (-1)(1)$

$= 7 \neq 0.$

$\Rightarrow$ A is invertible

54. $\begin{bmatrix} -1 & 3 \\ 0 & 3 \end{bmatrix}$ determinant $= (-1)(3) - (0)(3)$

$= -3 \neq 0$

$\Rightarrow$ INVERTIBLE

55. $\begin{bmatrix} 4 & -1 \\ 8 & -2 \end{bmatrix}$ determinant $= (4)(-2) - (-1)(8)$

$= 0$

NOT INVERTIBLE

56. $\begin{bmatrix} -1 & 2 \\ -1 & 2 \end{bmatrix}$ determinant $= -2 - (-2)$

$= 0$

NOT INVERTIBLE

59. $\begin{bmatrix} 2 & 1 \\ 3 & -1 \end{bmatrix}$ determinant $= (2)(-1) - (1)(3)$

$= -5$

$\therefore$ inverse $= \frac{1}{-5}\begin{bmatrix} -1 & -1 \\ -3 & 2 \end{bmatrix} = \begin{bmatrix} 1/5 & 1/5 \\ 3/5 & -2/5 \end{bmatrix}$

60. $\begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}$ determinant $= (1)(3) - (0)(2) = 3$

$\therefore$ inverse $= \frac{1}{3}\begin{bmatrix} 3 & -2 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 1 & -2/3 \\ 0 & 1/3 \end{bmatrix}$

61. $\begin{bmatrix} -1 & 4 \\ 5 & 1 \end{bmatrix}$ determinant $= (-1)(1) - (5)(4) = -21$

inverse $= -\frac{1}{21}\begin{bmatrix} 1 & -4 \\ -5 & -1 \end{bmatrix} = \begin{bmatrix} -1/21 & 4/21 \\ 5/21 & 1/21 \end{bmatrix}$

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

determinant $= (-2)(2) - (3)(1)$

$= -7$

inverse $= \frac{1}{-7} \begin{bmatrix} 2 & -1 \\ -3 & -2 \end{bmatrix}$

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