Math 12 H Answer Key – Section 9.7 – Determinants p. 713

#2) $\begin{bmatrix} 0 & -1 \\ 2 & 0 \end{bmatrix} \underset{\text{determinant}}{=} (0)(0) - (-1)(2) = 0+2 = \boxed{2}$

#4) $\begin{bmatrix} -2 & 1 \\ 3 & -2 \end{bmatrix} \quad (-2)(-2) - (1)(3) = 4-3 = \boxed{1}$

#6) $\begin{bmatrix} 3 \\ 0 \end{bmatrix}$ = not square = no determinant

#8) $\begin{bmatrix} 2.2 & -1.4 \\ .5 & 1.0 \end{bmatrix} = (2.2)(1.0) - (-1.4)(.5) = 2.2 + .7 = \boxed{2.9}$

#10) $A = \begin{bmatrix} 1 & 0 & \frac{1}{2} \\ -3 & 5 & 2 \\ 0 & 0 & 4 \end{bmatrix} \quad M_{33} = \begin{vmatrix} 1 & 0 \\ -3 & 5 \end{vmatrix} = 5-0 = 5$

$A_{33} = (-1)^{3+3} \cdot M_{33} = (-1)^6(5) = 5$

$\boxed{M_{33} = 5 \quad A_{33} = 5}$

#12) $\begin{bmatrix} 1 & 0 & \frac{1}{2} \\ -3 & 5 & 2 \\ 0 & 0 & 4 \end{bmatrix} \quad M_{13} = \begin{vmatrix} -3 & 5 \\ 0 & 0 \end{vmatrix} = 0-0 = 0$

$A_{13} = (-1)^{1+3} \cdot M_{13} = (-1)^4 \cdot 0 = 0$

$\boxed{M_{13} = 0 \quad A_{13} = 0}$

#14) $\begin{bmatrix} 1 & 0 & \frac{1}{2} \\ -3 & 5 & 2 \\ 0 & 0 & 4 \end{bmatrix} \quad M_{32} = \begin{vmatrix} 1 & \frac{1}{2} \\ -3 & 2 \end{vmatrix} = 2 - (-\frac{3}{2}) = 3.5$

$A_{32} = (-1)^{3+2}(3.5) = (-1)^5(3.5) = -3.5$

$\boxed{M_{32} = 3.5 \quad A_{32} = -3.5}$

#16) $A = \begin{bmatrix} 0 & -1 & 0 \\ 2 & 6 & 4 \\ 1 & 0 & 3 \end{bmatrix}$

$$\left|\begin{matrix} 0 & -1 & 0 & 0 & -1 \\ 2 & 6 & 4 & 2 & 6 \\ 1 & 0 & 3 & 1 & 0 \end{matrix}\right|$$

$$[(0\cdot 6\cdot 3)+(-1\cdot 4\cdot 1)+(0\cdot 2\cdot 0)] - [(-1)(2)(3)+(0)(4)(0)+(0)(6)(1)]$$

$$[(0)+(-4)+(0)] - [(-6)+0+0] = -4 - -6 = \boxed{2}$$

Since the $|A| \neq 0$, A has an inverse

#18) $\begin{bmatrix} -2 & -\frac{3}{2} & \frac{1}{2} \\ 2 & 4 & 0 \\ \frac{1}{2} & 2 & 1 \end{bmatrix}$

$$\left|\begin{matrix} -2 & -\frac{3}{2} & \frac{1}{2} & -2 & -\frac{3}{2} \\ 2 & 4 & 0 & 2 & 4 \\ \frac{1}{2} & 2 & 1 & \frac{1}{2} & 2 \end{matrix}\right|$$

Matrix has an inverse.

$$[(-8)+0+2] - [(-3)+0+1] = -6 - -2 = \boxed{-4}$$

#20) $\begin{bmatrix} 1 & 2 & 5 \\ -2 & -3 & 2 \\ 3 & 5 & 3 \end{bmatrix}$

$$\left|\begin{matrix} 1 & 2 & 5 & 1 & 2 \\ -2 & -3 & 2 & -2 & -3 \\ 3 & 5 & 3 & 3 & 5 \end{matrix}\right|$$

$$[(-9)+(12)+(-50)] - [(-12)+10+(-45)] = -47 - (-47) = 0$$

Determinant = 0 so there is no inverse