MTH 3331 Practice Test #1 - Answers

SUMMER 2013

Pat Rossi Name _____

1. ~

   (a) $\begin{bmatrix} 0 & 3 & 1 \\ 2 & 2 & 4 \\ 1 & -1 & 0 \end{bmatrix}$

   (b) $\begin{bmatrix} 0 & 2 & 1 \\ 3 & 2 & -1 \\ 1 & 4 & 0 \end{bmatrix}$

   (c) $\begin{bmatrix} 5 & 7 \\ 4 & 15 \\ 0 & 4 \end{bmatrix}$

   (d) Undefined

   (e) $\begin{bmatrix} 3 & 4 \\ 5 & 5 \\ 4 & 12 \end{bmatrix}$

   (f) $\begin{bmatrix} 1 & 0 \\ 2 & 5 \\ -1 & -4 \end{bmatrix}$

   (g) $\begin{bmatrix} 6 & 7 \\ 6 & 20 \\ -1 & 0 \end{bmatrix}$

   (h) Undefined

   (i) Undefined

2. ~

   (a) A

   (b) $B^TA^T + C^TA^T$

3. $\begin{bmatrix} 4 & -7 & 3 \\ -2 & 0 & 1 \\ 8 & 3 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 9 \\ 5 \\ 2 \end{bmatrix}$

4. See Solutions

5. $A^3 - BA^2 + A^2B - BAB + AB^2 - B^3$ or $A^3 + A^2B + AB^2 - BA^2 - BAB - B^3$ (This **can't** be simplified any further.)

6. See solutions.

7. See solutions.

8. See solutions.

9. See solutions.

10. $\begin{bmatrix} 1 & 0 & \dots & 0 & 0 \\ 0 & 1 & 0 & \dots & 0 \\ 0 & 0 & \ddots & & \vdots \\ \vdots & \vdots & & 1 & 0 \\ 0 & 0 & \dots & 0 & 1 \end{bmatrix}$

11. $\begin{bmatrix} -5 & 0 & -1 \\ 8 & 1 & 2 \\ -1 & 2 & 7 \end{bmatrix}$

12. $A^{-1} \begin{bmatrix} \frac{1}{3} & -\frac{2}{3} & \frac{1}{3} \\ \frac{1}{3} & \frac{1}{3} & -\frac{2}{3} \\ -\frac{2}{3} & \frac{4}{3} & \frac{1}{3} \end{bmatrix}$

13. ~

    (a) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

    (b) B is the multiplicative inverse of A. (i.e. $B = A^{-1}$)

    (c) Answer: $B = \begin{bmatrix} \frac{3}{4} & \frac{1}{2} & \frac{1}{4} \\ \frac{1}{2} & 1 & \frac{1}{2} \\ \frac{1}{4} & \frac{1}{2} & \frac{3}{4} \end{bmatrix}$

14. ~

    (a) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

    (b) $AB = 0$ does not imply that either $A = 0$ or $B = 0$.

15. $CA + CB$