

King Fahd University of Petroleum & Minerals
 Department of Mathematical Sciences
 MATH - 260 Semester o82 **Quiz - 3**

Name: _____ ID# _____ Section# _____

Problem. If

$$A = \begin{pmatrix} 2 & 1 & 3 \\ 2 & 1 & 1 \\ 4 & 5 & 1 \end{pmatrix}, \quad \text{and } B = \begin{pmatrix} 6 & 0 & 0 \\ 0 & 6 & 0 \\ 0 & 0 & 6 \end{pmatrix}$$

Find A^T , A^{-1} , and $(B^{-2}A)^{-1}$

Solution

$$A^T = \begin{pmatrix} 2 & 2 & 4 \\ 1 & 1 & 5 \\ 3 & 1 & 1 \end{pmatrix}$$

For A^{-1} you can use the determinant method or you can form the augmented matrix and apply row operations to obtain

$$A^{-1} = \begin{pmatrix} -\frac{1}{3} & \frac{7}{6} & -\frac{1}{6} \\ \frac{1}{6} & -\frac{5}{6} & \frac{1}{3} \\ \frac{1}{2} & -\frac{1}{2} & 0 \end{pmatrix}$$

$$(B^{-2}A)^{-1} = A^{-1}B^2 = \begin{pmatrix} -\frac{1}{3} & \frac{7}{6} & -\frac{1}{6} \\ \frac{1}{6} & -\frac{5}{6} & \frac{1}{3} \\ \frac{1}{2} & -\frac{1}{2} & 0 \end{pmatrix} (6\mathbf{I})^2$$

$$= 36 \begin{pmatrix} -\frac{1}{3} & \frac{7}{6} & -\frac{1}{6} \\ \frac{1}{6} & -\frac{5}{6} & \frac{1}{3} \\ \frac{1}{2} & -\frac{1}{2} & 0 \end{pmatrix}$$

$$= \begin{pmatrix} -12 & 42 & -6 \\ 6 & -30 & 12 \\ 18 & -18 & 0 \end{pmatrix}$$

