

Quiz # 4

Math 630 Linear Algebra

Problem 1

$$\begin{pmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{pmatrix} \rightarrow \begin{pmatrix} 1 & a & a^2 \\ 0 & b-a & b^2-a^2 \\ 0 & c-a & c^2-a^2 \end{pmatrix} \rightarrow \begin{pmatrix} 1 & a & a^2 \\ 0 & b-a & b^2-a^2 \\ 0 & 0 & (c-a)(c+b) \end{pmatrix}$$

$$\det = \prod_{i=1}^3 U_{ii} = (b-a)(c-a)(c+b)$$

Problem 2

$$\det \underline{A} = 4, \quad \underline{A}^{-1} = \frac{1}{4} \begin{pmatrix} 3 & 2 & 1 \\ 2 & 4 & 2 \\ 1 & 2 & 3 \end{pmatrix}$$

$$\underline{A}\underline{A}^{-1} = \underline{I} \quad \text{check } \checkmark$$

Problem 3

$$\det \underline{B} = \det(\underline{M}^{-1}) \det \underline{A} \det \underline{M} = \det \underline{A}$$

Note $\det(\underline{M}^{-1}) = 1/\det(\underline{M})$

$$\det(\underline{A}^{-1}\underline{B}) = \det(\underline{A}^{-1}) \det \underline{B} = 1$$

Problem 4

$$\det(2\underline{A}) = 2^n \det(\underline{A})$$

$$\det(-\underline{A}) = (-1)^n \det(\underline{A})$$

$$\det(\underline{A}^2) = (\det \underline{A})^2$$