

Math 308A Quiz #1

$$\begin{array}{cccccc} 0 & 1 & 2 & 0 & 0 & 1 \\ 0 & 0 & 2 & 4 & 1 & -2 \\ 0 & 0 & 0 & 0 & 1 & 2 \\ 0 & 0 & 0 & 0 & 2 & 4 \end{array}$$

Problem 1: The matrix $A = \begin{pmatrix} 0 & 1 & 2 & 0 & 0 \\ 0 & 0 & 2 & 4 & 1 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 2 \end{pmatrix}$. Vector $w = \begin{pmatrix} 1 \\ -2 \\ 2 \\ 4 \end{pmatrix}$.

Solve the equation $Ax = w$. Make clear which are the free variables.

Write the general solution x as a vector in parametric form.

Write w as a linear combination of the columns of A . (This should be with specific numbers, no variables.)

Problem 2: Short answer. Should require no calculation.

(a) Let w_1, w_2, \dots, w_j be in \mathbb{R}^n . Define $\text{Span}\{w_1, w_2, \dots, w_j\}$.

(b) In Problem 1, are the columns of A in the span of w ?

Yes _____ No _____

(c) In Problem 1, is the first column of A in the set spanned by the last 4 columns?

Yes _____ No _____