

Homework 7

Due Monday 1/30/17

1. Let $A = \begin{bmatrix} 1 & 2 \\ 5 & 12 \end{bmatrix}$.

(a) Find A^{-1} (directly or from the 2 by 2 formula).

(b) Suppose $b = \begin{bmatrix} -1 \\ 3 \end{bmatrix}$, $c = \begin{bmatrix} 1 \\ -5 \end{bmatrix}$, $d = \begin{bmatrix} 2 \\ 6 \end{bmatrix}$. Solve the three equations $Ax = b$, $Ax = c$, $Ax = d$ by using A^{-1} .

2. Taking A, b, c, d as before, solve the same equations ($Ax = b$, $Ax = c$, and $Ax = d$) by row reducing the augmented matrix

$$[A \ b \ c \ d].$$

As seen, the three equations can all be solved by the *same* set of row operations.

3. Find the inverse of A by row reducing the augmented matrix $[A \ I]$ to the form $[I \ A^{-1}]$, where A is

$$\begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix}.$$

4. Let A be given by

$$A = \begin{bmatrix} 0 & 2 & 0 & 0 \\ 0 & 0 & 2 & 0 \\ 0 & 0 & 0 & 2 \\ 0 & 0 & 0 & 0 \end{bmatrix}.$$

(a) Compute A^2 , A^3 , A^4 .

(b) Let $v = \begin{bmatrix} x \\ y \\ z \\ t \end{bmatrix}$. Compute A^2v , A^3v , A^4v .