**F17 10:10 Exam 1 Problem 1** Linear Algebra, Dave Bayer



## [Reserved for Score]

Test 1

Name	Uni	

[1] Find the general solution to the following system of equations.

$$\begin{bmatrix} 1 & 1 & 1 & 2 & 1 \\ 1 & 1 & 2 & 1 & 1 \\ 1 & 2 & 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} v \\ w \\ x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ -1 \\ 0 \end{bmatrix}$$

$$\begin{bmatrix} v \\ w \\ x \\ y \\ z \end{bmatrix} =$$

**F17 10:10 Exam 1 Problem 2** Linear Algebra, Dave Bayer



Test 1

[2] Using matrix multiplication, count the number of paths of length five from x to z.



number of paths =

**F17 10:10 Exam 1 Problem 3** Linear Algebra, Dave Bayer



Test 1

[3] Find the intersection of the following two affine subspaces of  $\mathbb{R}^3$ .

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} + \begin{bmatrix} 1 & 0 \\ 1 & 1 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} q \\ r \end{bmatrix}, \qquad \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} + \begin{bmatrix} 0 & 1 \\ 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} s \\ t \end{bmatrix}$$
$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} =$$

**F17 10:10 Exam 1 Problem 4** Linear Algebra, Dave Bayer



Test 1

[4] Find the 2  $\times$  2 matrix A that reflects across the line 4y = x.





Test 1

[5] Find a basis for the subspace of  $\mathbb{R}^4$  spanned by the following vectors:

(1, 1, -1, -1), (1, -1, 1, -1), (1, -1, -1, 1), (-1, 1, 1, -1), (-1, 1, -1, 1), (-1, -1, 1, 1)