

Math 1300 Fall 2013
Wednesday September 11 2013
Exercises

1. Find the inverse of the matrix:

$$\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$$

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2. Use a matrix equation to solve the system of linear equations:

$$\left\{ \begin{array}{rcl} 5x & + & 3y = 1 \\ 7x & + & 4y = 2 \end{array} \right\}$$

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3. A flu epidemic is spreading through a town of 48,000 people. It is found that if x and y denote the numbers of people sick and well in a given week, respectively, and if s and w denote the corresponding numbers for the following week, then:

$$\begin{aligned}\frac{1}{3}x + \frac{1}{4}y &= s \\ \frac{2}{3}x + \frac{3}{4}y &= w\end{aligned}$$

- (a) Write this system of equations in matrix form.

(b) Solve the resulting matrix equation for $X = \begin{bmatrix} x \\ y \end{bmatrix}$

- (c) Suppose that 13,000 people are sick in a given week. How many were sick the preceding week?

- (d) Same question as part (c), except assume that 14,000 people are sick.

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4. A teacher estimates that of the students who pass a test, 80% will pass the next test, while of the students who fail a test, 50% will pass the next test. Let x and y denote the number of students who pass and fail a given test, and let u and v be the corresponding numbers for the following test.

(a) Write a matrix equation relating $\begin{bmatrix} x \\ y \end{bmatrix}$ to $\begin{bmatrix} u \\ v \end{bmatrix}$.

- (b) Suppose that 25 of the teacher's students pass the third test, and 8 fail the third test. How many students will pass the fourth test? Approximately how many passed the second test?