Name: Recitation Section:

Math 2802 N1-N3 Quiz
January 26th, 2018

The quiz has a total of 10 points and you have 15 minutes. Read carefully and clearly justify how you obtained your answers.

1. [6 points]

Let $T : \mathbf{R}^3 \to \mathbf{R}^2$ be defined as $T \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 2x + 3y - z \\ 4x + 6y - 2z \end{pmatrix}$

   a) Find the standard matrix for T.

   b) Draw a picture of the range T.

   c) Is it onto? If not, find a vector b in $\mathbf{R}^2$ which is not in the range. (It is enough to use the picture in (b).)

2. [4 points] In a certian region, about 6% of a city's population moves to the surrounding suburbs each year, and about 4% of the suburban population movees into the city. In 2017, there where 10,000,000 residents in the city and 800,000 in the suburbs.

Set up a difference equation that describes this situation, where x_0 is the initial population in 2017.