Diagnostic Quiz 1. August 31, 2017

1. For each of the following systems of linear equations, determine whether the system has no solutions, a unique solution, or infinitely many solutions. (Note that you don’t actually have to solve these systems of equations to arrive at the correct answers):

(a) \[
\begin{align*}
\begin{cases}
  x_1 + 2x_2 - x_3 &= 1 \\
  x_2 - x_3 &= 5
\end{cases}
\end{align*}
\]

infinitely many solutions

(b) \[
\begin{align*}
\begin{cases}
  3x_1 + 2x_2 + 3x_3 &= 5 \\
  5x_2 - x_3 &= 7 \\
  11x_3 &= 2017.
\end{cases}
\end{align*}
\]

unique solution

(c) \[
\begin{align*}
\begin{cases}
  3x_1 + 2x_2 + 3x_3 &= 5 \\
  5x_2 - x_3 &= 7 \\
  10x_2 - 2x_3 &= 9.
\end{cases}
\end{align*}
\]

no solutions