Math 235H—Spring 2017
Homework due Tuesday, February 14

As always, make sure that you explain and justify your work. When the book asks a question, you need to give the answer and explain how you got that answer and how you know it’s correct (even if the online solutions manual just gives the answer). Use complete English sentences and make sure to staple your pages together (folding the corner over is not sufficient).

Do the following problems:

• From Section 2.1: 3, 7, 16, 27.

• From Section 2.2: 3, 11, 12, 16, 19, 21, 22.

• In solving a system of equations, we try to convert the system into another system, having the same solution set, for which it is easy to determine the solution set. In practice, this usually involves an “elimination” process. The operations we use to change the system are of three types: (a) multiply one equation by a nonzero real number; (b) add a multiple of one equation to another, and replace the second equation by that sum; and (c) switch two equations. For this problem, consider a system of \( m \) equations in \( n \) variables \( x_1, \ldots, x_n \)

\[
\begin{align*}
a_{1,1}x_1 + a_{1,2}x_2 + \cdots + a_{1,n}x_n &= b_1 \\
a_{2,1}x_1 + a_{2,2}x_2 + \cdots + a_{2,n}x_n &= b_2 \\
& \vdots \\
a_{m,1}x_1 + a_{m,2}x_2 + \cdots + a_{m,n}x_n &= b_m
\end{align*}
\]

and show that any operation of these three types leaves the solution set unchanged. So, for example, suppose you change the system by multiplying one of the equations by a nonzero real number. Show that any solution of the original system is a solution of the new system and any solution of the new system is a solution of the original system.