I. Systems of Linear Equations (in 3-variables):

\[ a_1x + b_1y + c_1z = d_1 \]
\[ a_2x + b_2y + c_2z = d_2 \]
\[ a_3x + b_3y + c_3z = d_3 \]

where \( a_i, b_i, c_i \) and \( d_i \) are real # constants

e.g., \( 2x + y - 2z = -1 \)
\( 3x - 3y - z = 5 \)
\( x - 2y + 3z = 6 \)

whose solution is \((x,y,z) = (1,-1,1)\)

since \( 2(1) + (-1) - 2(1) = -1 \)

and \( 3(1) - 3(-1) - (1) = 5 \)

and \( (1) - 2(-1) + 3(1) = 6 \)

II. Methods of Solution:

1. Elimination (p.210) — “reduce” to a 2 equation system
2. Graphing and/or substitution — not viable (not covered)
3. Matrix strategies — sections 3.4-3.5 (omit/not covered)
III. Examples (p.215): Exercises #6

IV. Three Possible Outcomes:
1. Unique solution $(x, y, z)$ — 3 planes intersect at a point
2. No solution — two (or more) planes are parallel, p.212
3. Infinitely many solutions — 2 planes are identical of the form... $(x, m_1x + b_1, m_2x + b_2)$ where $x$ is any real #

HW: pp.215-216 / Exercises #1-9(odd)
Read pp.254-261 (section 4.1)