Classwork 3 – ANSWERS

1. Solving the set of equations

   $$2x - y + 3z = 9$$
   $$x - y + 4z = 10$$
   $$3x + y + 2z = 6$$

   by Cramer's Rule yields $x = \dfrac{-10}{-10} = 1$ $y = \dfrac{10}{-10} = -1$ $z = \dfrac{-20}{-10} = 2$

2. Following the steps specified leads to

   $$x - y + 4z = 10$$
   $$y - 5z = -11$$
   $$10z = 20$$

   and the same answers follow.

3. Remove the common factor of 3 in the third equation, and subtract the first equation from it. Then add 2× the first to the second. Finally subtract 2/7 times the second equation from the third, which leads to

   $$x = 3 \qquad y = 1 \qquad z = 2$$

4. Use the same kind of strategy to reduce the equations to echelon form. The result is

   $$w = \frac{43}{2} \qquad x = -\frac{15}{2} \qquad y = -\frac{7}{2} \qquad z = 5$$

5. The third equation is a multiple of the first and so describes the same plane. This plane intersects the other in the line

   $$x = \frac{y+6}{5} = z - 1$$

   although you weren't asked to obtain this result. The determinant of the coefficients is zero because one line is a multiple of another.

6. Once again, the determinant of the coefficients is zero. However, this time the process of elimination leads to an inconsistency. The three planes are all different, but each pair intersects in a different parallel line, forming a toblerone structure.