Math 8
Winter 2020

Preliminary Homework
Assigned Monday, February 3

Note: Preliminary homework is always graded credit or no credit. **You get full credit for completing the assignment, whether or not your answers are correct.** The purpose of preliminary homework is to start you thinking about the topic of the next class.

You may use your preliminary homework in activities with your classmates. You should be sure to think about these questions so you will be prepared.

Preliminary homework is always due at the *beginning* of class.

Assignment:

1. (a) In a previous homework assignment, you showed the following:

   > Suppose an object starts at point (a, b, c) and moves with constant velocity $\vec{v} = \langle v_x, v_y, v_z \rangle$ for t seconds.
   > Then its final position is $(a + v_x t,\ b + v_y t,\ c + v_z t)$.

   What geometric object does the set of all points of the form $(a + v_x t,\ b + v_y t,\ c + v_z t)$ describe? (Be as specific as you can. For example, if the object were a sphere, a complete answer would not only say that, but also identify the center and radius.)

   (b) Find a vector parallel to the line through the points $(1, 1, 1)$ and $(2, 3, 4)$.

   (c) Find an expression of the form $(a + v_x t,\ b + v_y t,\ c + v_z t)$ describing all points on the line through the points $(1, 1, 1)$ and $(2, 3, 4)$.

   Hint: Use part (a). Choose any starting position and velocity that correspond to traveling along this line.

2. (a) What does the equation
$$\langle 1, 2, -1 \rangle \cdot \langle x, y, z \rangle = 0$$
   say about the position vector of the point (x, y, z)?

   (b) What geometric object does the equation
$$x + 2y - z = 0$$
   describe?