Math 2210 - Assignment 1

Dylan Zwick

Fall 2008

1 Sections 11.1 and 11.2

1.1 Section 11.1

11.1.1 Plot the points whose coordinates are $(1, 2, 3)$, $(2, 0, 1)$, $(-2, 4, 5)$, $(0, 3, 0)$, and $(-1, -2, -3)$. If appropriate, show the "box" as in Figures 4 and 5.

11.1.7 Show that $(2, 1, 6)$, $(4, 7, 9)$, and $(8, 5, -6)$ are vertices of a right triangle. *Hint:* Only right triangles satisfy the Pythagorean Theorem.

11.1.8 Find the distance from $(2, 3, -1)$ to

1. the xy-plane,

2. the y-axis, and

3. the origin.

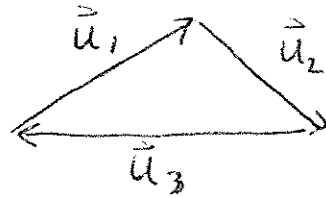**11.1.16** Complete the square to find the center and radius of the sphere with equation:

$$x^2 + y^2 + z^2 + 8x - 4y - 22z + 77 = 0$$

11.1.31 Find the arc length of the curve:

$$x = 2\cos t, y = 2\sin t, z = 3t; -\pi \leq t \leq \pi.$$

1.2 Section 11.2

11.2.4 Draw the vector w. $w = u_1 + u_2 + u_3$.

11.2.11 For the two-dimensional vectors **u** and **v** find the sum **u** + **v**, the difference **u** − **v**, and the magnitudes $||\mathbf{u}||$ and $||\mathbf{v}||$.

$$\mathbf{u} = <12, 12>, \mathbf{v} = <-2, 2>$$

11.2.15 For the three-dimensional vectors $\mathbf{u}$ and $\mathbf{v}$ find the sum $\mathbf{u} + \mathbf{v}$, the difference $\mathbf{u} - \mathbf{v}$, and the magnitudes $\|\mathbf{u}\|$ and $\|\mathbf{v}\|$.

11.2.19 A 300-newton weight rests on a smooth (friction negligible) inclined plane that makes an angle of 30° with the horizontal. What force parallel to the plane will just keep the weight from sliding down the plane? *Hint:* Consider the downward force of 300 newtons to be the sum of two forces, one parallel to the plane and one perpendicular to it.

11.2.22 A ship is sailing due south at 20 miles per hour. A man walks west (i.e., at right angles to the side of the ship) across the deck at 3 miles per hour. What are the magnitude and direction of his velocity relative to the surface of the water?