Quiz, Sep 11

Name:

Intersecting Curves. Find the points of intersection, if any, between the parametric curves $\vec{r}(t) = \langle t, 1\rangle$ and $\vec{s}(t) = \langle \cos t, \sin t\rangle$.

Equation of a plane. Find the equation of the plane which passes through the origin and contains the line $\langle t + 1, t - 1, 1\rangle$.

Parametric curves and lengths.

- A clock has a second hand which is 4cm long, and a bug travels from the center of the clock to the edge of the clock by walking along the second hand. While the bug travels, the second hand keeps turning. It takes the bug 2 minutes to travel from the center to the end of the second hand, and the bug begins its journey at midnight. Write down a parametric equation for the path of the bug. (Assume that the clock is centered at the origin, that $t = 0$ is midnight, the time t is measured in seconds, and that the 12 o'clock point is oriented along the y-axis.)

- Write down an integral which computes the distance that the bug has traveled (don't evaluate the integral, but simplify it.)

Bonus Problem. *Worth no points!* Show that if a curve $\vec{r}(t)$ has constant non-zero distance from a plane, that it is necessarily the case that it is parallel to the plane.