# MATH 11: MULTIVARIABLE CALCULUS <br> FALL 2018 <br> HOMEWORK \#2 

Please turn in your completed homework assignment by leaving it in the boxes labeled "Math 11" in the hallway outside of Kemeny 105 anytime before 3:30 p.m. on Wednesday, September 26.

Problem 1.
(a) Find a vector function $\mathbf{r}(t)=\langle x(t), y(t), z(t)\rangle$ that represents the curve of intersection of the two surfaces

$$
x^{2}+y^{2}=1 \quad \text { and } \quad z=x^{2} .
$$

(b) Sketch the two surfaces and the curve.
(c) Find parametric equations for the tangent line to the curve at the point $(0,1,0)$.

Problem 2. A Blue Angels pilot is at position $(0,0,3)$ at time $t=0$ and starts flying in a spiral trajectory given by $\mathbf{r}(t)=\langle 3 \sin t, 4 t, 3 \cos t\rangle$. Where is the pilot after he's flown 10 units of arc length along this trajectory? What are his velocity and speed at that point?

