MA 261 Quiz 2
January 22, 2019

If you do not know how to do any one of these problems, circle **"(E) I don't know"** as your answer choice. You will receive **two points** for doing that. **Each problem is worth five points**. You get **two points** for writing your **full name** and **three points** for writing your **section number**.

Problem 2.1. At what points does the curve $\mathbf{r}(t) = \langle t, 0, 2t - t^2 \rangle$ intersect the paraboloid $z = x^2 + y^2$?
 (A) $(0,0,0), (1,0,1)$
 (B) $(2,0,4), (2,0,0)$
 (C) $(-1,0,-3), (1,1,2)$
 (D) $\left(1, \frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right), (0,1,1)$
 (E) I don't know how to do this

Problem 2.2. What does the equation

$$x^2 - 2y^2 + z^2 = -1$$

represent as a surface in $\mathbf{R}^3$?
 (A) elliptic paraboloid
 (B) hyperboloid of one sheet
 (C) hyperboloid of two sheets
 (D) hyperbolic paraboloid
 (E) I don't know how to do this

Problem 2.3. Two particles travel along the curves

$$\mathbf{r}_1(t) = \langle t, t^2 + 1, -t \rangle, \text{ and } \mathbf{r}_2(t) = \langle 1 + 2t, 3 + t, 4 + 3t \rangle.$$

What is their first point of collision?
 (A) $(-1, 2, 1)$
 (B) $(1, 2, -1)$
 (C) $(1, 3, 4)$
 (D) the particles do not collide
 (E) I don't know how to do this