

MA 261 QUIZ 2

JANUARY 21, 2018

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) $(1, \frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}), (0, 1, 1)$
- (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