

# SPRING 2024 MATH 102, SECTION 11

## QUIZ 3

Name: \_\_\_\_\_

Time limit: 20 minutes

Consider the parametric curves

$$C_1 : \mathbf{r}_1(t) = (t + 1)\mathbf{i} + (2t + 1)\mathbf{j} + (2t^3 - 1)\mathbf{k}, \quad t \in \mathbb{R},$$

$$C_2 : \mathbf{r}_2(t) = (2 - t)\mathbf{i} + (3 - 4t + t^2)\mathbf{j} + (1 - t^2)\mathbf{k}, \quad t \in \mathbb{R},$$

in  $\mathbb{R}^3$ .

**1.** (2 points) Show that the point  $(2, 3, 1)$  is on both curves  $C_1$  and  $C_2$ .

**2.** (8 points) Find an equation of the plane  $E$  which is tangent to both  $C_1$  and  $C_2$  at the point  $(2, 3, 1)$ .