

Quiz 4

MATH 261, CALCULUS III, FALL 2017

CLASS TIME:

NAME:

Instructions: Solve as many of these problems as you can. Circle the correct answer, and show your work!

Problem 1. A particle moves with acceleration $\vec{a}(t) = e^t \vec{k}$ and initial velocity and position

given by $\vec{v}(0) = 0$ and $\vec{r}(0) = \vec{j} + \vec{k}$ respectively. Where is the particle at time $t = 2$?

- (a) $(0, 1, e^2 - 2)$
- (b) $(0, 1, e^2)$
- (c) $(0, 1, e - 1)$
- (d) $(1, 1, e^2 - 2)$
- (e) $(1, 1, e^2)$.

Problem 2. A particle moves along according to $\vec{r}(t) = \langle 5t, 1 - 3t, 5 + 4t \rangle$ for $t \geq 0$. What is the x coordinate of the particle after it has traveled a distance of 2 units along the curve?

- (a) 10
- (b) $\sqrt{2}$
- (c) $5\sqrt{2}$
- (d) $\frac{1}{10}$
- (e) $\frac{5\sqrt{2}}{2}$.

Problem 3 The unit tangent vector to the curve $\vec{r}(t) = t\vec{i} + 3t^2\vec{j} + 4 \sin t\vec{k}$ at $t = \pi/3$ is

- (a) $\vec{i} + 2\pi\vec{j} + 2\vec{k}$
- (b) $(\vec{i} + 2\pi\vec{j} + 2\vec{k})/\sqrt{5}$
- (c) $\vec{i} + \pi\vec{j} + 2\sqrt{3}\vec{k}$
- (d) $(\vec{i} + \pi\vec{j} + 2\sqrt{3}\vec{k})/\sqrt{13 + \pi^2}$
- (e) $(\pi\vec{j} + \vec{k})/\sqrt{1 + \pi^2}$.

Problem 4 The trajectory of a moving particle is given by $\vec{r}(t) = (t^2/2 - t, \cos(t - 1), \ln(1 + t) - t/2)$. When the speed is zero, the acceleration \vec{a} is

- (a) $(0, 0, 0)$
- (b) $(1, -1, -\frac{1}{4})$
- (c) $(1, -1, \frac{1}{4})$
- (d) $(1, 1, -\frac{1}{4})$
- (e) $(1, -1, -\frac{1}{4})$.