MA 227, CALCULUS III
Fall, 2010

Name (Print last name first): ....

Student Signature: ....

$$\boxed{\textbf{TEST I}}$$

10 questions, 10 points each. SHOW ALL YOUR WORK!

Question 1

Calculate the cross product of $\mathbf{r}_1 = (1, -1, 1)$ and $\mathbf{r}_2 = (3, 1, -1)$.

Answer: ....

Question 2

Let $\mathbf{r}(t) = (4t^{1/4},\ t,\ e^{t^3-1})$. Find $\mathbf{T}(1)$.

Answer: ....

Question 3

Let $\mathbf{r}(t) = (t^2, t, t^3)$. Find SYMMETRIC equation of the tangent line at point $t = 1$.

Answer: ....

Question 4

Let $\mathbf{r}(t) = (\sin(t), e^t, t)$. Find curvature κ at point $t = 0$.

Answer: ....

Question 5

Find the area of the parallelogram generated by the vectors $(1, 1, -1)$ and $(-2, 1, 2)$.

Answer: . . . .

Question 6

Find equation of the plane containing the points $(1, 2, 1)$, $(1, 1, -1)$ and $(-1, 2, 1)$.

Answer: . . . .

Question 7

A particle moves with position function $\mathbf{r}(t) = (t^2,\ \cos(t),\ t)$. Find velocity, acceleration and tangential and normal components of acceleration at point $t = 0$.

Answer: ....

Question 8

Find parametric equation of the line which passes through the point $(1, \ 1, \ -1)$ and is orthogonal to the vectors $\mathbf{i} - \mathbf{j}$ and $\mathbf{j} + \mathbf{2k}$.

Answer: ....

Question 9

A particle moves with acceleration $\mathbf{a}(t) = (e^t, 0, 1)$. Find velocity and position function if the initial data are $\mathbf{v}(0) = (1, 1, 1)$, $\mathbf{r}(0) = (0, 1, 0)$.

Answer: ....

Question 10

Find the length of the curve given by $\mathbf{r}(t) = (2 \sin t, t, 2 \cos t)$ when $2 \leq t \leq 5$.

Answer: ....