MA 227, CALCULUS III

Spring, 2013

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

Student Signature: .....

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 $\mathbf{r}_2 = (2, 2, -1)$.

Answer: .....

Question 2

Let $\mathbf{r}(t) = (5t^{-1/5}, t^3, e^{t^2-1})$. Find $\mathbf{T}(1)$.

Answer: .....

Question 3

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

Answer: .....

Question 4

Let $\mathbf{r}(t) = (\cos(t), e^t, t^2)$. Find curvature κ at point $t = 0$.

Answer: .....

Question 5

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

Answer: .....

Question 6

Find equation of the plane containing the points $(2, 1, 1)$, $(1, 2, -2)$ and $(-1, 0, 1)$.

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

Answer: .....

Question 10

Find the length of the curve given by $\mathbf{r}(t) = (3\sin t, -2t, 3\cos t)$ when $1 \leq t \leq 4$.

Answer: .....