

MA 227, CALCULUS III
 Fall, 2011

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 $\mathbf{r}_1 = (1, -1, 2)$ and $\mathbf{r}_2 = (3, 2, -1)$.

Answer:

Question 2

Let $\mathbf{r}(t) = (2t^{1/2}, t^2, e^{t^4-1})$. Find $\mathbf{T}(1)$.

Answer:

Question 3

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

Answer:

Question 4

Let $\mathbf{r}(t) = (\sin(t), e^{-t}, t^2 - 1)$. Find curvature κ at point $t = 0$.

Answer:

Question 5

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

Answer:

Question 6

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

Answer:

Question 7

A particle moves with position function $\mathbf{r}(t) = (t^3, \sin(t), t^2 + 1)$. 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 $(2, 1, -1)$ and is orthogonal to the vectors $\mathbf{i} + \mathbf{j}$ and $2\mathbf{j} - \mathbf{k}$.

Answer:

Question 9

A particle moves with acceleration $\mathbf{a}(t) = (0, e^{-t}, 2)$. 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 $\mathbf{r}(t) = (2t, -2 \sin t, 2 \cos t)$ when $1 \leq t \leq 3$.

Answer: