

MA 126 - 8C, CALCULUS II
 April 19, 2016

Name (Print last name first):

Student Signature:

TEST 3

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

Question 1

Calculate the cross product of $\mathbf{r}_1 = \langle 2, -1, 1 \rangle$ and $\mathbf{r}_2 = \langle 1, 2, -1 \rangle$.

Answer:

Question 2

Let $\mathbf{r}(t) = \langle 6\sqrt{t}, t^2, e^{t^3-1} \rangle$. Find the unit tangent vector at $t = 1$, i.e. $\mathbf{T}(1)$.

Answer:

Question 3

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

Answer:

Question 4

Find parametric equations of the line which passes through the point $(1, 0, 1)$ and is orthogonal to the plane $2x + y - z + 2 = 0$.

Answer:

Question 5

Find the area of the parallelogram generated by the vectors $\langle 1, -1, 1 \rangle$ and $\langle -2, 1, 2 \rangle$.

Answer:

Question 6

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

Answer:

Question 7

a) Find equation of the plane which passes through the point $(1, -1, 1)$ and is parallel to the plane $x + 2y - z - 1 = 0$.

Answer:

b) What is the distance between those two planes?

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 $\mathbf{j} - \mathbf{k}$.

Answer:

Question 9

Find (the coordinates of) the point of intersection of the plane $2x + y - z = 2$ and the line given by the parametric equations

$$\ell := \begin{cases} x = 2 + t \\ y = 1 - t \\ z = -1 + t \end{cases}$$

Answer:

Question 10

Find the length of the curve given by $\mathbf{r}(t) = \langle t, 2 \sin t, -2 \cos t \rangle$ when $1 \leq t \leq 5$.

Answer:

Question 11

Find the distance between two lines:

$$\frac{x-1}{2} = \frac{y}{1} = \frac{z+1}{1}, \quad \frac{x}{1} = \frac{y}{-1} = \frac{z-1}{1}.$$

Answer: