Question 1

Calculate the cross product of \( \mathbf{r}_1 = (1, -1, 2) \) and \( \mathbf{r}_2 = (3, 2, -1) \).

Answer: 

Question 2

Let \( \mathbf{r}(t) = (2t^{1/2}, t^2, e^{t-1}) \). 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 \( \kappa \) 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: 