Assignment 10

The due date for submitting this assignment has passed. Please ensure you have submitted this assignment.

Due on 2020-04-06, 23:58 EST.

1. The equation of the normal plane to the curve \( \gamma: x = t, y = t^2, z = 1/t \) at \( t = 1 \) is

   \[
   (x - 1) + 2(y - 1) + 0(z - 1) = 0
   \]

   1 point.

2. The formula \( a \times b = c \), where the symbols have their usual meanings, is

   (a) True
   (b) False

   1 point.

3. The point of Fermat's formula, \( \frac{2}{3}, -\frac{1}{3} \) only, where the symbols have their usual meanings, is

   (a) True
   (b) False

   1 point.

4. The tangent to the curve \( \gamma: x = t, y = t^3, z = 1/t \) at \( t = 1 \) is given by

   \[
   \left( 
   \begin{array}{c}
   \dot{x} \\
   \dot{y} \\
   \dot{z}
   \end{array}
   \right) = \left( 
   \begin{array}{c}
   1 \\
   3t^2 \\
   -1/t^2
   \end{array}
   \right)
   \]

   Then the resultant, \[ x = 1 + \frac{3}{2}t^2, y = t^3 + \frac{3}{2}t, z = 1/t \]

   at \( t = 1/2 \) is

   (a) \[ \left( \frac{3}{2}, \frac{9}{2}, 2 \right) \]
   (b) \[ \left( \frac{3}{2}, \frac{9}{2}, 1 \right) \]
   (c) \[ \left( \frac{3}{2}, \frac{9}{2}, 0 \right) \]

   3 points.

5. For the point \( P = (1, 2, 3) \), the normal \( N = (2, 2, 1) \), the tangent \( T = (1, 1, -2) \) and the binormal \( B = (1, 1, 2) \), the principal normal \( N' \) is given by

   \[
   \frac{\langle N, N' \rangle}{\langle N, N' \rangle} N
   \]

   Then the resultant, \[ x = t, y = t^2, z = t^3 \] at \( t = 2 \) is

   (a) \[ (2, 4, 8) \]
   (b) \[ (2, 4, 10) \]
   (c) \[ (2, 4, 12) \]

   3 points.

6. For the curve \( \gamma: x = t, y = t^2, z = t^3 \) at \( t = 1 \) is given by

   (a) \[ x^{(1)}, y^{(1)}, z^{(1)} \]
   (b) \[ x^{(2)}, y^{(2)}, z^{(2)} \]
   (c) \[ x^{(3)}, y^{(3)}, z^{(3)} \]

   Then the resultant, \[ x = t, y = t^2, z = t^3 \] at \( t = 1 \) is

   (a) \[ (1, 4, 27) \]
   (b) \[ (1, 4, 12) \]
   (c) \[ (1, 4, 9) \]

   3 points.