Answer on Question #72687, Math / Geometry

Reparameterize the curve w.r.t arc length parameter s: γ(t)=(2t,1-3t,5+4t).

Answer:

Let's figure out for what value of t will we get the point (0, 1, 5). First, we consider, t = 0.

$$2t = 0 \rightarrow t = 0$$

If t = 0, then we need 1-3(0) = 1 and 5+4(0) = 5, which are both true. So, this happens at t = 0. This is our initial value. Now, let's figure out s(t).

First,

$$\gamma'(t) = <2 + (-3) + 4>$$

$$s(t) = \int_0^t \sqrt{(2)^2 + (-3)^2 + (4)^2} d\tau$$

$$s(t) = \int_0^t \sqrt{4 + 9 + 16}\, d\tau$$

$$s(t) = \int_0^t \sqrt{29}\, d\tau$$

$$s(t) = t\sqrt{29}$$

Once we have our expression $s(t) = t\sqrt{29}$ we can solve for t.

We get

$$t = \frac{s}{\sqrt{29}}$$

We get final answer.

$$y(s) = \frac{2}{\sqrt{29}}s, 1 - \frac{3}{\sqrt{29}}s, 5 + \frac{4}{\sqrt{29}}s$$

Answer provided by AssignmentExpert.com