FINAL EXAMINATION Math 317 - Calculus IV

Answer - key

1. The particle moves along the parabola $x = y^2$. Starting at (1, 1) at time t = 0, through the origin and over to (1, -1) at $t = \pi$, then back to it starting point at $t = 2\pi$.

2. see midterm - solutions

3. $\vec{r}(t) = (t, t^2, 4t^2 + t^4)$ 4. $\vec{T} = \frac{1}{\sqrt{3}}(1, 1, 1), \ \vec{N} = \frac{1}{\sqrt{2}}(-1, 1, 0), \ \vec{B} = \frac{1}{\sqrt{6}}(-1, -1, 2), \ \kappa = \frac{\sqrt{2}}{3}$ $\vec{r}(s) = \left(\left(\frac{s}{\sqrt{3}}+1\right) \cos \ln \left(\frac{s}{\sqrt{3}}+1\right), \left(\frac{s}{\sqrt{3}}+1\right) \sin \ln \left(\frac{s}{\sqrt{3}}+1\right), \frac{s}{\sqrt{3}}+1\right)$ 5. (c) $f(x, y, z) = xe^y + ye^z + C, \ \int_C \vec{F} \cdot d\vec{r} = 2$ 6. (b) 0 7. (a) $9 \ln 3 + \frac{464}{5}$, (b) $\frac{1}{6}(27 - 5\sqrt{5})$ 8. (b) $-\pi$ 9. (b) $\frac{32\pi}{3}$

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