Date: June 27, 2013, Thursday

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NAME:..

STUDENT NO:..

DEPARTMENT:..

Math 102 Summer 2013 – QUIZ # 5 – Section 001

Find the length of the curve $\mathbf{r}(t) = <t, 3\cos t, 3\sin t>, -5 \leq t \leq 5$.

Solution:

The length is $L = \displaystyle\int_{-5}^{5} |\vec{v}(t)|\, dt$.

Here $\vec{v}(t) = (1, -3\sin t, 3\cos t)$, so $|\vec{v}(t)| = \sqrt{10}$. Then the length becomes

$$L = \int_{-5}^{5} |\vec{v}(t)|\, dt = L = \int_{-5}^{5} \sqrt{10}\, dt = 10\sqrt{10}.$$