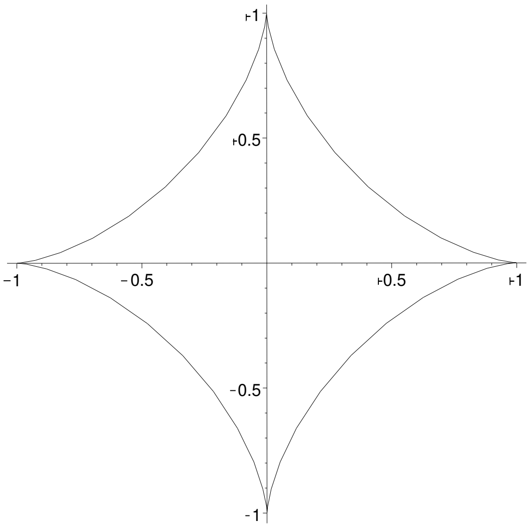
2E2 Tutorial Sheet 19 Third Term[1]

6 April 2004

1. (2) $\mathbf{a} = 3\mathbf{i} + 2\mathbf{j} + 3\mathbf{k}$ and $\mathbf{b} = 2\mathbf{i} - 9\mathbf{k}$. find $\mathbf{a} + \mathbf{b}$, $\mathbf{a} \cdot \mathbf{b}$ and $\mathbf{a} \times \mathbf{b}$. $\mathbf{c} = (0, 7, 2)$, find $\mathbf{a} \cdot \mathbf{c}$ and $\mathbf{b} \times \mathbf{c}$.

2. (3) $\mathbf{r}(t) = \sin \pi t^2 \mathbf{i} + \cos \pi t^2 \mathbf{j} + t^2 \mathbf{k}$ for $t \geq 0$ is a curve in space. Work out its length between its starting point, $(0, 1, 0)$, and $(0, -1, 1)$.



3. The figure shows the curve $\mathbf{r}(t) = \cos^3 t\mathbf{i} + \sin^3 t\mathbf{j}$. Work out its total length.

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