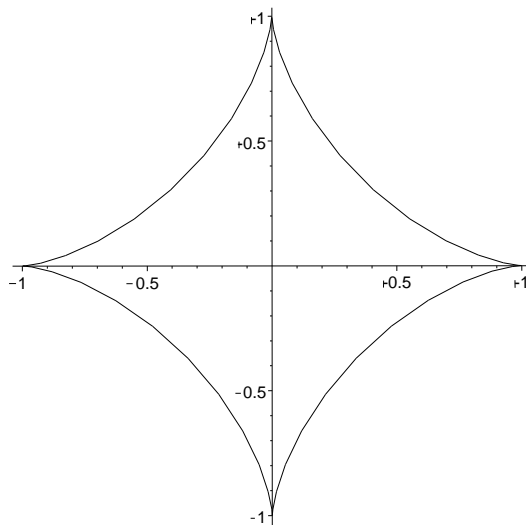


## 2E2 Tutorial Sheet 19 Third Term<sup>1</sup>

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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