

Quiz 3 — MA261 — June 23, 2017

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1. (12 points) A particle has the velocity function $\mathbf{v}(t) = \langle 2e^t, \sqrt{8}, 2e^{-t} \rangle$ and initial position $(1, 2, 3)$. Find the speed, position, and acceleration functions for the particle.

$$\begin{aligned}\mathbf{a}(t) &= \langle 2e^t, 0, -2e^{-t} \rangle \\ \mathbf{r}(t) &= \langle 2e^t - 1, \sqrt{8}t + 2, -2e^{-t} + 5 \rangle \\ s(t) &= 2e^t + 2e^{-t} = 4 \cosh(t)\end{aligned}$$

2. (8 points) Find and sketch the domain of $f(x, y) = \sqrt{x^2 - y^2}$.

$$\begin{aligned}x^2 - y^2 \geq 0 &\text{ so } x^2 \geq y^2 \text{ and } |x| \geq |y|. \\ \text{Therefore } -x &\leq y \leq x \text{ or } x \leq y \leq -x.\end{aligned}$$

