Quiz 7; Wednesday, March 9
MATH 53 with Professor Stankova
Section 109; 11-12
GSI: Eric Hallman

Student name:

You have 10 minutes to complete the quiz. Calculators are not permitted, and remember to show your calculations and explain your reasoning in order to receive full credit.

1. A goat is running around in a circle, and as a function of time its position is given by $\langle x, y\rangle = \langle 2 + \cos t, \sin t\rangle$. If R is the goat's distance from the origin, use the Chain Rule to find dR/dt.

   $R(x, y) = \sqrt{x^2 + y^2}$ so

$$\begin{aligned} dR/dt &= \frac{\partial R}{\partial x} dx/dt + \frac{\partial R}{\partial y} \\ &= \frac{y\cos t - x\sin t}{\sqrt{x^2+y^2}} \\ &= \frac{\sin t\cos t - (2+\cos t)\sin t}{\sqrt{(2+\cos t)^2 + \sin^2 t}} \\ &= \frac{-2\sin t}{\sqrt{5+4\cos t}}. \end{aligned}$$