Quiz 9

1. (7 points). A spherical balloon is being inflated at $2000\,\text{cm}^3/\text{s}$. How fast is the surface area changing when the balloon has a circumference of 50 cm?

2. (8 points). A runner sprints around a circular track of radius 100 m at a constant speed of 7 m/s. The runner's friend is standing at a distance 200 m from the center of the track. At what rate is the distance between them changing when they are 200 m apart?

Extra credit. (2 points). Use a linear approximation to argue that $1.01^n \approx 1 + \frac{n}{100}$ for $n \geq 0$.