# Final Review Worksheet

## Math 1A, section 103

## May 4, 2014

0. (Warmup.) What is $\lim_{x \to 2} x^2 + 1$?

1. Find $\lim_{x \to \infty} \frac{4x^2 + x + 1}{x^2 + 3x + 5}$.

2. Find the derivative of $f(x) = \ln(1 - \sin(x))$. What is the domain of $f$?

3. Use Newton's method to approximate $\sqrt{2}$.

4. If a sphere has volume $36\pi$ with a maximum possible error margin of $\pi$, what is the maximum possible error margin in the measure of the radius of the sphere?

5. Use implicit differentiation to find the slope of the tangent line to the curve $2^y + xy = x^2$ at the point $(2, 1)$.

6. Find the minimum possible distance from a point on the line $y = 3 - 2x$ to the origin.

7. A Ferris wheel with a radius of 10 m is rotating at a rate of one revolution every 2 minutes. How fast is a rider rising when his seat is 16 m above ground level?

8. What is $\int e^{e^x} \cdot e^x \, dx$?

9. Find $\int_0^{10} \sqrt{100 - x^2} \, dx$.

10. Suppose a certain donut can be modeled by revolving the circle of radius $r$ centered at $(r, 0)$ about the $y$-axis. If a donut hole from the same company is a sphere with radius $r$, how much larger is the donut than the donut hole, by volume?