

# Math 1A Worksheet 27

November 14th, 2007

- Find antiderivatives for:
  - $f(x) = \sin x + x \cos x$ ,
  - $f(x) = 2x \cos x^2$ ,
  - $f(x) = \cosh x$ .
- A particle moves with acceleration  $a(t) = \cos t + \sin t$  and initial position and velocity  $s(0) = 0$  and  $v(0) = 5$ . Find a formula for the position of the particle at time  $t$ .
- Sketch the graph of  $f(x) = \cos^2 x$ . Then sketch the graph of the antiderivative  $F$  of  $f$  based *only* on the graph of  $\cos^2 x$ , using the initial condition  $F(0) = 0$ .
- This problem is about practicing with Riemann sums. I know a lot of you know how to do this with integration. You can use that to check the answer, but you have to do this problem using Riemann sums, not integration.
  - Find the area under the curve  $f(x) = x^3$  from  $x = 0$  to  $x = 1$  in three different ways: taking  $x_i^*$  to be (i) the left endpoint, (ii) the right endpoint, or (iii) the midpoint of the  $i$ th interval. In each case, use subintervals of equal length and sketch the approximating rectangles.
  - Looking at the approximating rectangles, which choices give you an underestimate of the area? Which give an overestimate?
  - Did your three answers agree?
- Find all infinitely-differentiable functions  $f$  such that  $f'' = f'''$ .