Caveat: The appearance of a problem on this review sheet doesn't guarantee that a similar problem will appear on the exam. Similarly, the non-appearance of a kind of a problem doesn't imply that it won't appear on the exam. Last, the number of problems on this review and their difficulty is not to be taken as a statement about the exam. Enjoy!

NO CALCULATORS OR COMPUTERS

1. Integrate the following indefinite integrals. (And do lots of others!)

$$\int \frac{dx}{(x-2)(x+3)(x-4)} \qquad \int \cos(x)e^{\sin(x)}\,dx \qquad \int x^3\cos(x)\,dx$$

2. Integrate the following definite integrals. **Go as far as is sensible**.

$$\int_{-1}^{1} \frac{dx}{(x-3)(x+2)} \qquad \int_0^{\pi} \cos(x)e^{\sin(x)}\,dx \qquad \int_1^{e} x^3\ln(x)\,dx$$

3. Assess the following improper integrals. Determine if they converge. You might need the comparison theorem or the limit comparison theorem. You might have to "build a case." If they converge, try to get a precise answer. (And do lots of other integrals!)

$$\int_2^{\infty} \frac{dx}{x(\ln(x))^2} \qquad \int_{-3}^{4} \frac{dx}{(x+3)^3(x-4)^4} \qquad \int_1^{\infty} \frac{\cos(x)}{x^2}dx \qquad \int_1^{\infty} \frac{1}{3x^2-1}dx$$

4. Also, do some L'Hôpital's rule limit calculations, okay?

5. Use the arclength formula to find the length of the straight line that connects the point (2, 3) to the point (4, 2).

6. What is the arclength in $\mathbb{R}^3$ (yes, YOU have to generalize what we did in class on Friday!) for the parametric curve f(t) = (x(t), y(t), z(t)) = (t, t^2, t^3), where $t \in [-3, 5]$?