Note: the appearance of a problem on this review doesn't guarantee the appearance of a similar problem on the exam. Equally, the non-appearance of a sort of problem does not guarantee that a problem of that sort won't appear on the exam. This is a review, intended as something helpful for studying. (FWIW: This is the test I gave to a Calc II class in the last few years. Also, I thought it pretty easy, so your class's test will likely be harder. Also, there will probably be at least one explicit l'Hôpital question.)

1. (20 points each) Appropriately solve the following integrals.

$$\int x^{100} \ln(x)\, dx$$

$$\int_1^{e^\pi} \frac{\cos(\ln(x))}{x}\, dx$$

$$\int \frac{1}{(x+2)(x+3)}\, dx$$

2. (25 points) Calculate the arclength of a parameterized curve in 2-dimensions given by a function defined from the unit interval $[0, 1] \to \mathbb{R}^2$. The function:

$$p(t) = \left(3t^5, 2t^5\right)$$

3. (10 points each) Do the following integrals converge or diverge (to infinity)?

$$\int_1^\infty \frac{1}{e^x + x - 1}\, dx$$

$$\int_0^1 \frac{1}{x^{5/4}}\, dx$$