Here are some practice problems to review some of the material you studied in Math 124, 125 at UW or comparable courses elsewhere. The first quiz will include similar problems.

If you need additional practice, use the review exercises for the chapters on differentiation, linear approximation, integration, and methods of integration. In our book, these are p. 271, #1-47 and #55-59; p. 431, #9-37; and p. 541, #1-9 and #17. The odd-numbered problems have answers in the back of the book. (If you have the multivariable version of the book which starts on p.651, you can find the earlier part of the book on reserve at the Odegaard Undergraduate Library and at the Mathematics Library. These page numbers are for the 5th edition of the "early transcendentals" version of the book.). You can also check out old final exams and other materials for Math 124 and 125 which can be accessed at the following websites: www.math.washington.edu/~ m124 and www.math.washington.edu/~ m125.

[1] *Differentiation.*

(a) Find $f'(x)$ if $f(x) = \sec^3 x$. Determine the domain of $f'(x)$.

(b) Find $\dfrac{d^2y}{dt^2}$ if $y = \arctan t$.

(c) Let $f(x) = \frac{\cos^2 x}{1+\tan^2 x}$. Find $f'(x)$.

(d) Find $\dfrac{dy}{dx}$ if $y = x^3 \cos(5^{x^2})$.

(e) Let $f(t) = t^t$. Find the following values if possible: $f'(0)$, $f'(1)$, $f'(e)$.

(f) Find $\dfrac{du}{dv}$ if a and b are constants and $u = \ln(a(\tan(bv))$.

[2] *Linear Approximation and tangent lines.* Find the linear approximation of the function $f(x) = \sqrt{1-x}$ at $a = 0$, and use it to approximate the numbers $\sqrt{0.9}$ and $\sqrt{0.99}$. Graph the function f and the tangent line at the point $a = 0$. Based on the picture, determine if your estimates are above or below the actual values.

[3] *Integration.*

(a) Evaluate $\displaystyle\int_{2/3}^{\infty} \frac{dx}{9x^2+4}$.

(b) Evaluate $\displaystyle\int_{e}^{e^2} \frac{dx}{x(\ln x)^p}$, where p is a constant.
(Be sure to consider all possible real number values for p!)

(c) Evaluate $\int x3^{-2x}dx$.