This is a review sheet for the sections in the syllabus that were not covered in the previous review sheets. When you study for the final exam, you should look at this review sheet and the review sheets for Exam 1 and Exam 2.

(1) Consider the partition 
\[ x_0 < x_1 < x_2 < x_3 < x_4 = b \]
where \( x_0 = -4, x_1 = -1, x_2 = 5, x_3 = 10, x_4 = 20 \). Assume \( f(x) = -x^2 \). Find the Riemann sum corresponding to this partition, this function \( f(x) \) and the sample points \( c_1 = -2, c_2 = 4, c_3 = 7, c_4 = 12 \). What is the norm of this partition?

(2) Evaluate 
\[ \int e^{5x} \, dx, \quad \int e^{3x}(e^{-7x} + e^{2x}) \, dx \quad \text{and} \quad \int \frac{e^{4x} - e^{5x}}{e^{2x}} \, dx. \]

(3) Evaluate 
\[ \int (\sqrt{x} + x^2)(x^3 - x^{-1/2}) \, dx \quad \text{and} \quad \int \frac{\sqrt{x} + x^4}{x^{3/2}} \, dx. \]

(4) Evaluate 
\[ \int \tan^2 x \, dx \quad \text{and} \quad \int \cot^2 x \, dx. \]

(5) Evaluate 
\[ \int_{-e^3}^{-e^2} \frac{dx}{x} \quad \text{and} \quad \int_{\pi/3}^{\pi/6} \sec x \tan x \, dx. \]

(6) Assume that \( f(x) \) is a continuous function defined on the interval \([1, 12]\) such that 
\[ \int_1^7 f(x) \, dx = -3, \quad \int_5^{12} f(x) \, dx = 4, \quad \int_5^7 f(x) \, dx = -8. \] Evaluate \( \int_1^{12} f(x) \, dx. \)

(7) Evaluate 
\[ \frac{d}{dx} \int_2^x t^2 e^{t^2} \, dt \quad \text{and} \quad \frac{d}{dx} \int_{-x}^5 t(1 + t^6)^{1/2} \, dt. \]

(8) A particle has velocity \( v(t) = t^3 - 5t^2 + 6t \) feet per second, where \( t \) is time measured in seconds. Find the displacement of the particle over the time interval \([1, 5]\). Find the total distance traveled over the time interval \([1, 5]\).

(9) Evaluate these integrals:
\[ \int \tan x \, dx, \quad \int \cot x \, dx, \quad \int_1^2 x\sqrt{3x + 2} \, dx, \quad \int x^2 \sin(5x^3 + 7) \, dx \]
\[ \int (5 + \cos x)^3 \sin x \, dx, \quad \int \tan^4 x \sec^2 x \, dx, \quad \int \frac{x^3 \, dx}{x^4 + 2}, \quad \int \frac{dx}{\sqrt{36 - 25x^2}} \]
\[ \int \frac{x^3 \, dx}{\sqrt{1 - x^2}}, \quad \int \frac{x^4 \, dx}{1 + x^{10}}, \quad \int \frac{dx}{x^2 + 4x + 5} \]

(10) A bacterial population in a petri dish triples in size every 5 days. How long does it take for this population to double in size?

(11) We start out with a 7 microgram sample of a certain radioactive isotope. After 8 days have passed, we find that 2 micrograms of the sample have decayed. What is the half-life of this isotope?

(12) Find the area of the region bounded by \( y = x^2 \) and \( y = 7x - 10 \).