

Recitation # 7: Exponential models and approaches to integration

Group work:

Problem 1 Vitameatavegamin is a strange substance that comes in two forms. V-I decays at a linear rate, while V-II decays at an exponential rate. Both have the property that 10 ounces will decrease to 7 ounces in 6 hours. For each of V-I and V-II, answer the following:

- (a) If we started with 80 ounces, how much will there be 6 hours later?
- (b) How long will it take to decrease from 15 ounces to 7.5 ounces?

Problem 2 Evaluate

$$\int \frac{5x^3 - 6x + 2}{x - 5} dx.$$

Problem 3 Evaluate

$$\int \frac{5}{3^{2x} + 3^{-2x}} dx.$$

Problem 4 Evaluate the following integrals

(a) $\int \frac{\cos x}{1 + \sin x} dx$

(b) $\int \frac{1}{\sin x - 1} dx$

Problem 5 Evaluate the following integrals

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(a) $\int \frac{13}{\sqrt{12x - x^2 - 20}} dx$

(b) $\int \frac{13x^3}{\sqrt{12x^6 - x^8 - 20x^4}} dx$

(c) $\int \frac{13e^{4x}}{\sqrt{12e^{6x} - e^{8x} - 20e^{4x}}} dx$
