# 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?*

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**Problem 2** *Evaluate*

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

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**Problem 3** *Evaluate*

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

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**Problem 4** *Evaluate the following integrals*

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

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

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**Problem 5** *Evaluate the following integrals*

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

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

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