Recitation # 7: Exponential Models and Integration By Parts

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 the following integrals*

(a) $\int_1^3 x^2 5^x \, dx$

(b) $\int \arcsin(x) \, dx$

(c) $\int x^{\frac{5}{3}} (\ln x)^2 \, dx$

Problem 3 *Evaluate the following integral*

$\int \sin(3x) e^{7x} \, dx$

Problem 4 *Evaluate the following integrals*

(a) $\int x^5 \cos\left(x^3\right) \, dx$

(b) $\int \cos\left(\sqrt{x}\right) \, dx$

(c) $\int x \cos x \sin x \, dx$
