Math 1210 **Name:** _____

Worksheet 11 **July 31, 2020**

Ex 1. You've recently deposited \$2000 into an investment account that earns 7% annual interest. You recall that an account earning compound interest can be modeled as $b(t) = Ae^{kt}$.

a) If you take the time of deposit to be $t = 0$, what is the value of A?

b) Since your account earns 7% interest annually, this means your account balance will be \$2140 after one year. Use this to determine the growth factor k.

c) How many years will you have to wait for your investment to reach \$4000?

Ex 2. Carbon-14 is an isotope found in organic material. The presence of the isotope decays exponentially, so it can be modeled as a function of the form $f(t) = Ae^{-kt}$.

a) The half-life of Carbon-14 is 5730 years. Use this information to determine the decay factor k.

b) During one of his adventures, Indiana Jones finds a skeleton at an archaeological dig site. He determines that the skeleton contains 15% of the Carbon-14 that a fresh skeleton would contain. How long ago did the skeleton die?

Ex 3. Find the following antiderivatives:

a) $\int \left(x^{100} + \sqrt{x}\right) dx$

b) $\int x(\sqrt[3]{x} + \sqrt[4]{x})\, dx$

c) $\int \dfrac{2x + 3x^3 - x^4 + 1}{x^4} dx$

d) $\int \dfrac{5}{5x + 2}\, dx$ [Hint: Find a function (involving a logarithm) whose derivative is $\frac{5}{5x+2}$]