§3.8, Exponential Growth + Decay, examples.

Suppose you invest $1,000 in an account that earns 5% interest compounded continuously. How much do you have in 50 years?

If $A(t)$ is the amount of money in your account at time t, then

$$\frac{dA}{dt} = 0.05 \cdot A(t)$$

$$\Rightarrow A(t) = A(0) \cdot e^{0.05t} \Rightarrow$$

$$A(50) = 1000 \cdot e^{0.05 \cdot 50}$$

$$= \$12,182.49$$

You earn 6% interest, compounded quarterly. If you start with $1000, how much do you have in 8 years?

$$A(t) = A(0) \cdot \left(1 + \frac{r}{n}\right)^{n \cdot t}$$

- r is int rate
- n is # times compounded
- t is time in years

$$A(8) = 1000\left(1 + \frac{.06}{4}\right)^{4 \cdot 8} = 1000(1 + .015)^{32} = 1000(1.015)^{32} =$$

$\$1610.32$