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Day 33 is Monday, April 8, 2013

Returning to example from end of class on Thursday.

example:

Find the particular antiderivative

$$S(t) = \int 20 - 20e^{(-.05t)} dt$$

that satisfies $S(0) = 0$

Result: General Antiderivative:

$$S(t) = 20t + 400e^{(-.05t)} + K$$

↳ undetermined constant

The particular Antiderivative that satisfies the additional condition $S(0) = 0$ is

$$S(t) = 20t + 400e^{(-.05t)} - 400.$$

New example with the same underlying math, but presented in a different way.

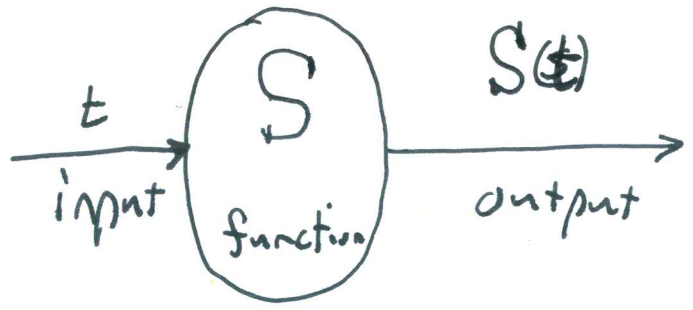
Car company is selling new model of car.

t = variable representing time (in months)

Since the car was introduced.

$S(t)$ = function representing total sales (in ^{millions of} dollars) at ~~the end of the~~ ~~the~~ time t .

capital



total sales (from the beginning) at time t .

We are told that $S'(t) = 20 - 20e^{-.05t}$

Note: we are given the derivative of $S(t)$. We are not given $S(t)$.

Questions:

- (A) Find the formula for $S(t)$
- (B) Use that formula to estimate the total sales at the end of the 1st year.
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Solution

Observation: We know that $S(0) = 0$ because the total sales at time 0 will necessarily be 0.

So we are looking for a function $S(t)$ that ~~satisfies~~ satisfies these two conditions:

- $S'(t) = 20 - 20e^{-.05t}$
- $S(0) = 0$

