

## Answer on Question #60771 – Math – Calculus

### Question

44. Capital value: find the capital value of an asset that generates \$7200 yearly income if the interest rate is as follows.

- a) 5% compounded continuously
- b) 10% compounded continuously

### Solution

- a)  
For continuously compound interest

$$A = P \cdot e^{rt}, \quad (1)$$

where

$P$  = principal amount (initial investment)

$r$  = annual interest rate (as a decimal)

$t$  = number of years

$A$  = amount after time  $t$ .

Let's solve the equation, where  $P$  is unknown,

$$A = P + 7200 \text{ (asset after 1 year)}, \quad (2)$$

$r = 0.05$  (interest rate/100%)

$t = 1$  (1 year)

Substitute all values in the formula (2) using the formula (1):

$$P \cdot e^{0.05} = P + 7200$$

$$P \cdot (e^{0.05} - 1) = 7200$$

$$P = 7200 : (e^{0.05} - 1) \approx \$140430.00.$$

- b)

Similarly to a)

$r = 0.10$  (interest rate/100%)

$$P = 7200 : (e^{0.10} - 1) \approx \$68459.99.$$

**Answer: a) \$140430.00; b) \$68459.99.**