


7.4 Section Continuous Income Streams

Formula: Total Value (TV) = $\int_a^b R(t) dt$
Revenue Equation

Ex: # 4

$$R(t) = 300 + 4.5t - 0.05t^2$$

Step 1 $TV = \int_0^{92} (300 + 4.5t - 0.05t^2) dt$
b/c $(0 \leq t \leq 92)$

Step 2 IS  downward parabola b/c of $-0.05t^2$

Step 3 Put in calculator to solve
= \$33,466 Income for shop during open months

Present Value / Future Value

Future Value formula:

$$FV = \int_a^b R(t) e^{r(b-t)} dt$$

* How much money will be in account
@ end of certain time.

(@ time $t=b$)

r = rate

t = variable

$R(t)$ = Revenue

b = ending days

a = starting day

Ex #5 $R(t) = 300 + 4.5t - 0.05t^2$ ($0 \leq t \leq 92$)

$r = 5\% = 0.05$

$a = 0$; $b = 92$

$[0, 92]$

Plug into formula:

$$\int_0^{92} (300 + 4.5t - 0.05t^2) e^{0.05(92-t)} dt$$

* Plug into calculator =

$\$33,880^{00}$
ending amount

Present value ($t=a$) * how much is it worth now?

$$\text{Formula: } PV = \int_a^b R(t) e^{r(a-t)} dt$$

* Previous page states what variables mean

Ex #6

$$PV = \int_0^{92} (300 + 4.5t - 0.05t^2) e^{\frac{0.05}{365}(0-t)} dt$$

= Plug into calculator and find PV = .

b/c 5% APR is annual, we need to convert to days, so $\frac{0.05}{365 \text{ days}}$

* I.e. If time is in days & interest rate in years you have to adjust to match. *