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Applications

CONTINUOUS income streams.

EX1: Find the total income over the next 10 yrs from a cont. income stream that has an annual flow of \$12,000 (example: rent).

EX2: A small company models its monthly income w/ $f(t) = 10,000 e^{0.02t}$. How much income in the 1st 2 yrs?

Present Value If $f(t)$ is the rate of continuous income flow earning interest at rate r , compounded continuously, then the present value of the cont. income stream is:

$$PV = \int_0^k f(t) e^{-rt} dt.$$

EX3: A cont. income stream has an annual rate of flow of $f(t) = 9000 e^{0.12t}$. Find the present value of this income stream for the next 10 yrs, if money is worth 6%, comp. cont.

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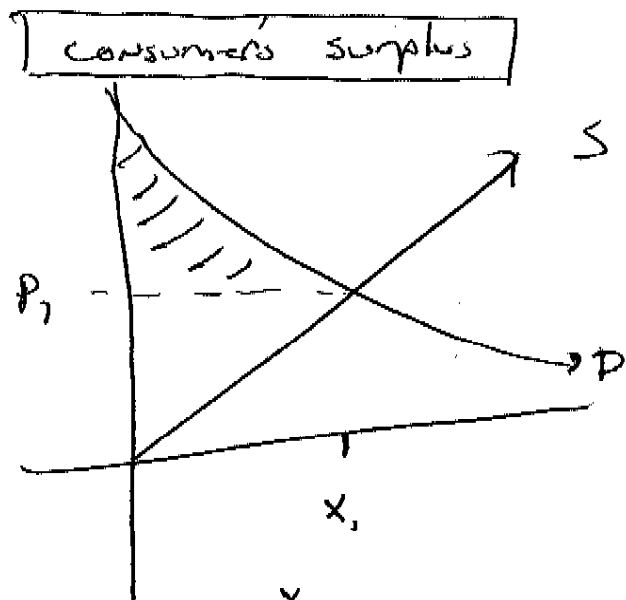
Future Value : If $f(t)$ is the rate of cont.

income flow for k yrs earning interest at rate r , compounded cont., then the future value of the cont. income stream is:

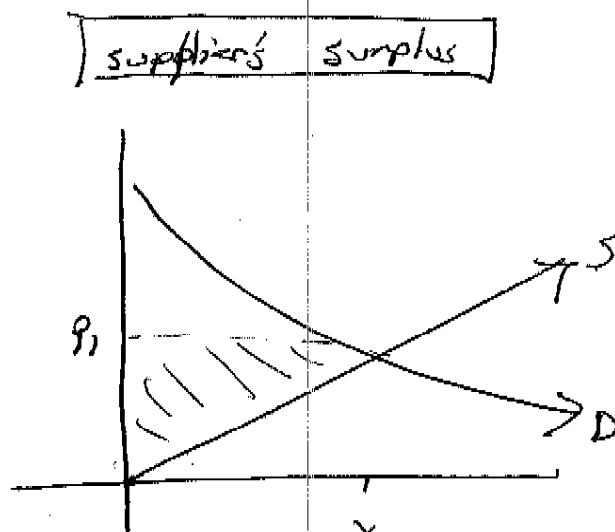
$$FV = e^{rk} \int_0^k f(t)e^{-rt} dt.$$

Ex : Suppose that a cont. income stream has an annual rate of flow given by $5000e^{-0.07t} = f(t)$, and suppose that money is worth 7% compounded continuously. Create the integral used to find:

- a) the total income for the next 5 yrs.
- b) PV for the next 5 yrs.
- c) FV 5 yrs from now.



$$CS = \int_0^{X_1} D dx - P_1 X_1$$



$$SS = P_1 X_1 - \int_0^{X_1} S dx$$

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Ex: If demand is $p = \frac{100}{x+1}$ and supply

is $p = x+1$, and the market equilibrium is at $(9, 10)$,

create the integral used to find:

- consumer's surplus
- producer's surplus.