

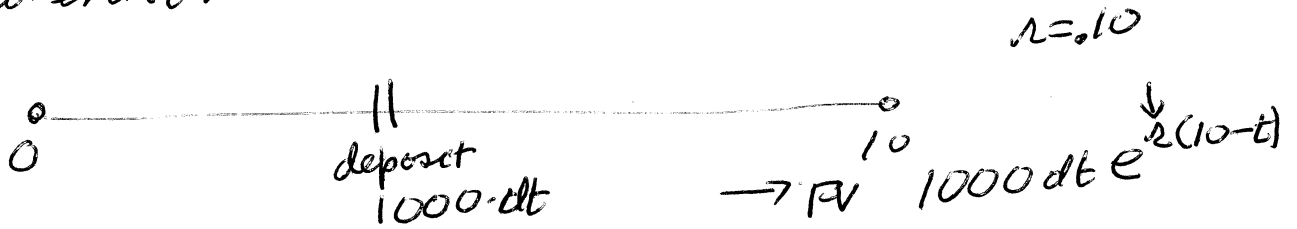
Income Stream:

20090410

1/3

5.5.24 FV of income [investment] stream

Money transferred $C \leftarrow \text{con}$ at the constant rate of \$1000/yr
 The [balance in] the account earns 10% CC. How much at end of 10



$$\text{Total FV} = \sum_{t=0 \dots 10} 1000 dt e^{-0.10(10-t)}$$

$$\xrightarrow{dt \rightarrow 0} \int_0^{10} 1000 e^{-0.10(10-t)} dt$$

$$= 0.00 - \frac{1000}{0.10} e^{0.10(10-t)} \Big|_{t=0}^{t=10}$$

$$= -\frac{1000}{0.10} [e^0 - e^1]$$

$$= \overset{\text{clear}}{=} \overset{\text{N.B.}}{\frac{1000}{0.10}} (e^{0.10(10)} - 1) = 17.18281 \times 1000$$

(also --)

(17182.82)

Picture
PV Payment 1000/yr for 10 years. PV

$$PV = \int_{t=0}^{t=10} 1000 e^{-0.10t} dt = 10000 \left(-\frac{1}{0.10} e^{-0.10t} \right) \Big|_{t=0}^{t=10}$$

=

Consumer demand for $p = D(q)$

= price consumers are willing to pay for an additional unit

Consumer's willingness to spend

= rate of change [deriv!] wrt q of the consumer's

"Consumer's [are] willing to spend willingness" $A(q)$
(not $A'(q)$)

for [first] q units

~~$A(q) - A(0) = \int$~~

p. 426 For q_0 units

$$A(q_0) - A(0) = \int_0^{q_0} \frac{dA}{dq} dq = \int_0^{q_0} D(q) dq$$

usually 0

$D(q)$ = "marginal willingness to spend"



= "Area under consumer's demand curve"

Ex 5.4 p 426 $D(q) = A'(q) = 4(25 - q^2)$

(makes sense only for ≥ 0 , $0 \leq q \leq 5$.)

~~$A(q) - A(0) = \int$~~

Spend to ^{usually 0} Willing to spend for "3 units"

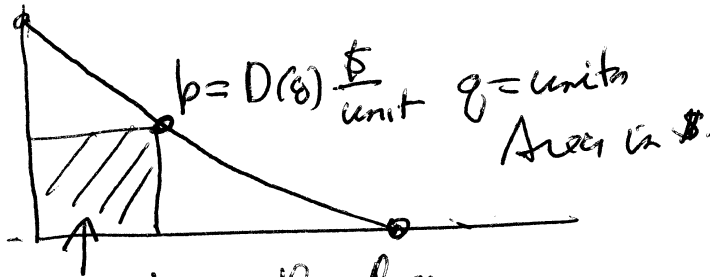
$$A(3) = \int_0^3 4(25 - q^2) dq = \dots 264$$

Consumer's Surplus CS

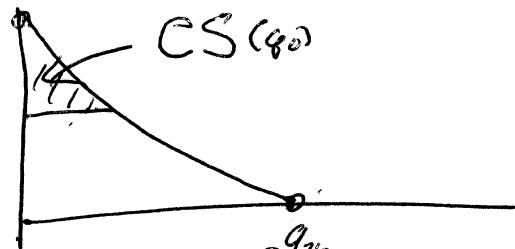
$$[CS] = [\text{willingness to spend}] - [\text{actually spent}]$$

"Revenue"
at price q

$$= p_0 q_0$$



CS at price level q_0
"Area" = $p_0 q_0$

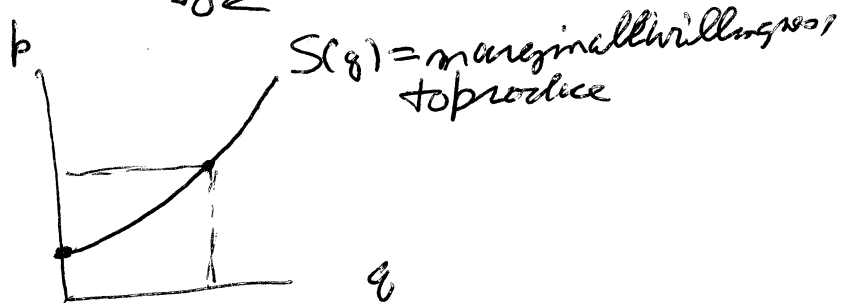


$$CS(q_0) = \int_0^{q_0} D(q) dq - p_0 q_0$$

(or price p_0) (also $\int_0^{q_0} (D(q) - p_0) dq$)

$\int_0^{q_0} dq$ q changes from 0 to q_0

Producer's Surplus



$$[PS]_{q_0} = [\text{actual expenditure at price } q_0] - \text{Willingness to produce}$$

$$\int_0^{q_0} S(q) dq$$

Gets better at "equilibrium price q
where $D(q) = S(q)$