

Quiz this week S.1-S.3

S.3.9) $MC \left[\frac{dC}{dq} \right] = 3(q-4)^2$

"total manufacturing cost increase" raising production level from 6 to 10 units [from 6 to x units]

F.P.C $C(10) - C(6) = \int_6^{10} 3(q-4)^2 dq$

$\int 3(q-4)^2 dq \rightarrow$ guess and check

$\int 3u^2 du = \frac{3u^3}{3} = (q-4)^3 + C$
 $u = q-4; du = dq$ u means $q-4$

$\int_6^{10} 3(q-4)^2 dq = \int_{u=2}^{u=6} 3u^2 du = u^3 \Big|_{u=2}^{u=6} = 6^3 - 2^3$

$6^3 = \frac{36}{6} = 216$

$2^3 = 8$

$= 216 - 8 = 208$

3rd Method for Int.

What is $C(q)$ all $q \geq 6$ (actually, don't do)

$C(q) - C(6) = \int_6^q 3(s-4)^2 ds$

(neutral) $= (s-4)^3 \Big|_{s=6}^{s=q} = (q-4)^3 - (6-4)^3$

not eligible
q means something else

S.3.57) Crop increases at rate $0.3t^2 + 0.6t + 1$ bushels per day

How much will value of crop increase if market price remains at \$3/bushel

Value = $3q$ q bushels

$Value(t) - Value(0) = 3 \int_{t=0}^{t=t} (0.3s^2 + 0.6s + 1) ds$

$= 3 \left(\frac{0.3s^3}{3} + \frac{0.6s^2}{2} + s \Big|_{s=0}^{s=t} \right) = 3(0.1t^3 + 0.3t^2 + t) - (0,1)$

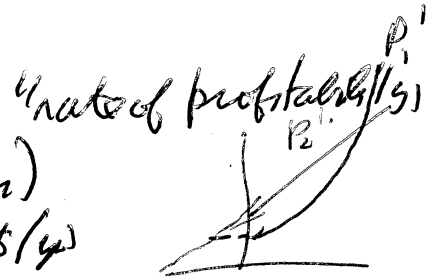
~~Graph~~ interesting but omitted

Lorentz Curves

5.4. prob 4 & 40

Profit $P_1'(t) = 100 + t^2$ (hundred \$/yr)

$P_2'(t) = 220 + 2t$ (hundred \$/yr)



a) Note $P_2'(0) > P_1'(0)$ rate

exceeds until $P_1' = P_2'$

$$220 + 2t = 100 + t^2$$

$$0 = t^2 - 2t - 120$$

$$= (t - 12)(t + 10)$$

get lucky!

until $(t=12)$

Net excess profit = $\int_0^{12} (220 + 2t) - (100 + t^2) dt$ ↓ careful

$$= \int_0^{12} (120 + 2t - t^2) dt$$

$$= 120t + t^2 - \frac{t^3}{3} \Big|_{t=0}^{t=12}$$

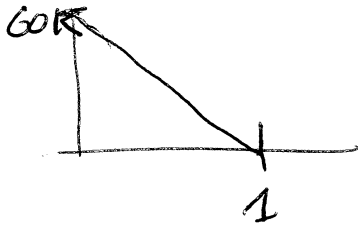
$$= (120 \cdot 12) + 12^2 - \frac{12^3}{3} = 1008$$

(winds $[0, 12]$ $[100, 500]$)

fn Profit $(Y_2 - Y_1)$ 1008

[38] [39] inventory of 60 000 kg used const. rate 2009. 3/3
 exhausted at end of year

average inventory $\frac{1}{T} \int_0^T I(t) dt \approx 30,000$



$$y = 60 \text{ ~~000~~ K} - 60Kt$$

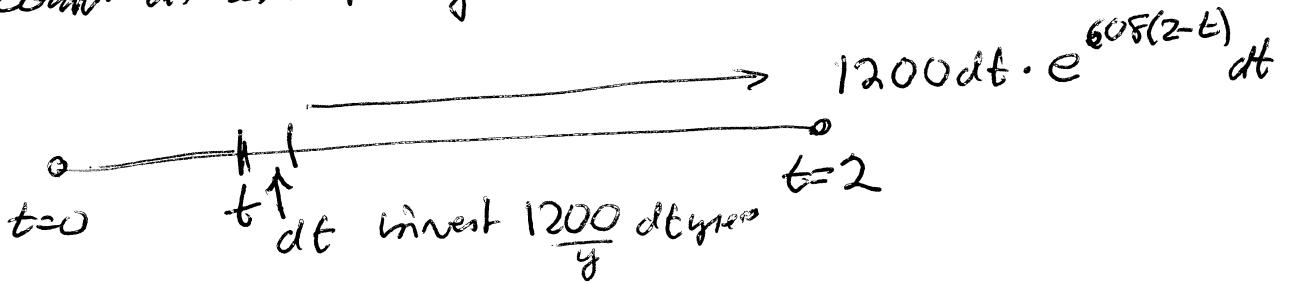
integral $\frac{1}{T} \int_0^T 60K(1-t) dt$

$$= 60K \left(\frac{1-t}{2} \right) \Big|_{t=0}^{t=1} = 60K \left(\frac{0}{2} - \frac{1}{2} \right) = \frac{1}{2} 60K = 30000$$

[p.424] FV Income Stream 8% CC

Continuous

[B3.2] invest (C) constant rate 1200 per year
 Account at end of 2 years



Income stream ≈ 2602 without at rate of $\frac{1200}{y}$.

