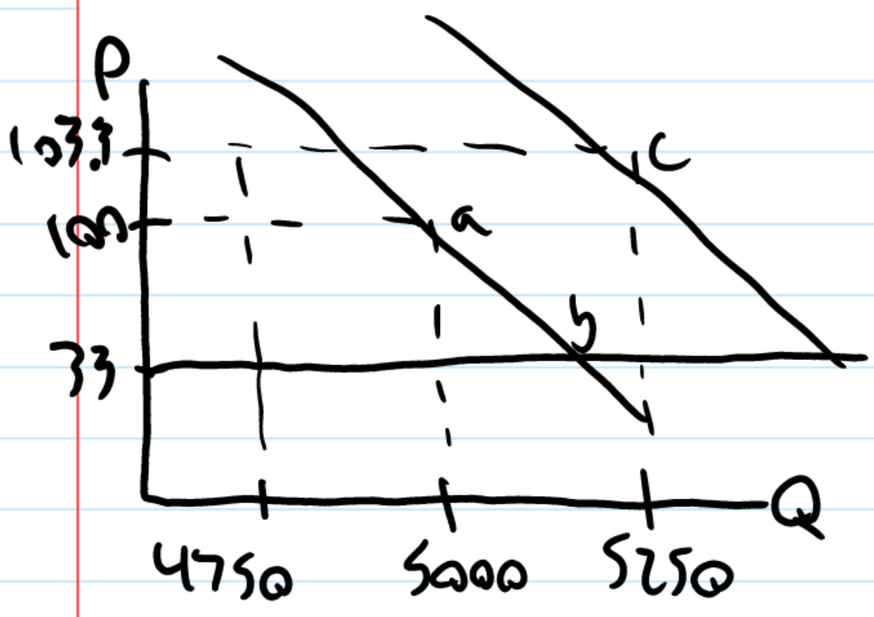
HW 6 Opportunity Cost of Inputs 4

Monday, October 5, 2020 2:41 PM

Passed Solution review

A project requires signing buying 500 cubic yards of concrete per week for the next year from the only local provider. The currently price is $100 per yard and the provider sells 5,000 yards per week. Assuming marginal cost is constant, elasticity of demand at the current price is -1.5, and using a linear demand approximation, estimate the opportunity cost of the weekly government purchase. The METB is 0.2. Note you will need to find the original demand, the new demand, the new price, and the new quantity purchased by those other than the government in the process.



$$-1.5 = \frac{Q-5000}{P-100}\cdot\frac{100}{5000}$$

$mcq' = 500$

$MC = P(1+1/ed) = 100(1+1/-1.5) = 33\frac{1}{3}$ ✓ $P = MC(n/(1+n))$

$(-1.5)(50)(P-100)+5000 = Q = 12500-75P$ ✓

$Q^m = Q+q'-75P = 13000-75P$

$75P = 13000-Q^m$

$P = \frac{13000-Q^m}{75}$

~~$MR = 173.3 - .026 = 33.3$~~ $MR \to P = 166.67 - 1/75q \to MR = 166.67 - 2/75q$

$-.026Q^2 = -140$

$Q^2 = 5250 = Q^2$

$5250 = 13000-75P$ $q = 13000-75P$

$75P = 7750$

$P = 103.\overline{3}$

$SC = (5250-4750)\cdot 103\frac{1}{3} - (\frac{1}{2}\cdot(103\frac{1}{3}-100)(5250-4750)) + (.2)(5250-4750)(103.\overline{3})$

$SC = 500\cdot 103\frac{1}{3} - 625 + 10333\frac{1}{3}$

$SC = 51666.\overline{66} - 625 + 10333\frac{1}{3}$

$SC = 61,175$

New MR:

$Q = 13000-75A \to A = 173.33 \to MR = 173.33 - 2/75q$

New q: $MR = MC \to 173.33 - 2/75q = 33.33 \to q = 5250$

Private $q = 5250-500 = 4750$

New P: $5250 = 13000-75P \to P = 103.33$

New Surplus:

$\Delta CS = -3.33\cdot 4750 - 3.33\cdot 250/2 = -16331.75$

$\Delta PS = 70\cdot 5250 - 66.67\cdot 5000 = 34150$

$\Delta GS = -103.33\cdot 500 = -51665$

$\Delta SS = -4700+4950-(1.2\cdot 51665) = -61748$