

7.2 - Consumer's and Producer's Surplus

An application of Area between Curves:

CS: Let (\bar{x}, \bar{p}) be a point on the graph of $p = D(x)$:

$$CS = \int_0^{\bar{x}} (D(x) - \bar{p}) dx$$

Area represents total savings to consumers willing to pay more than \bar{p} .

PS: Let (\bar{x}, \bar{p}) be a point on the graph of $p = S(x)$:

$$PS = \int_0^{\bar{x}} (\bar{p} - S(x)) dx$$

Area represents total gain to producers willing to supply at a price lower than \bar{p} .

Example (#44): Find the consumers' surplus at a price level of $\bar{p} = \$120$ for the price-demand equation $p = D(x) = 200 - 0.02x$. Sketch a graph.

Example: Find the consumers' surplus and the producers' surplus at the equilibrium price level for the price-demand equation $p = D(x) = 20 - 0.05x$ and the price-supply equation

$p = S(x) = 2 + 0.0002x^2$. Sketch a graph.