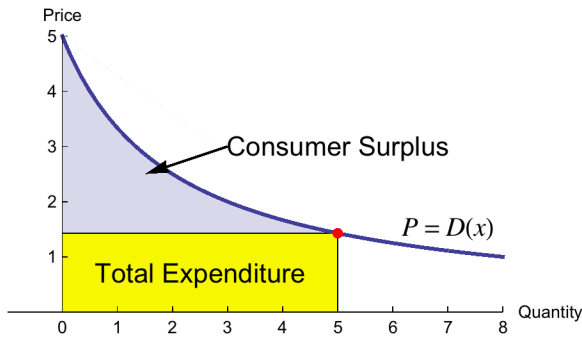


5.1 Consumer Surplus and Producer Surplus

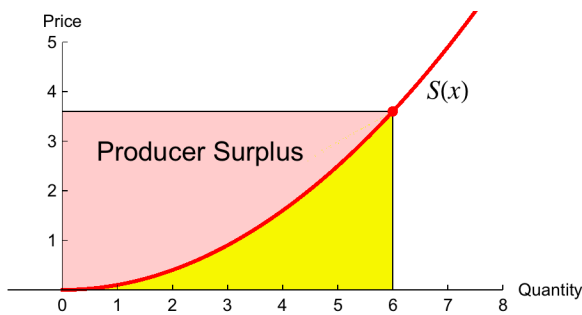
Consumer Surplus



$$\text{Consumer Surplus} = \int_a^b D(x) dx - QP$$

Example 1 The demand function above is $D(x) = \frac{10}{x+2}$. Find the total expenditure and the consumer surplus.

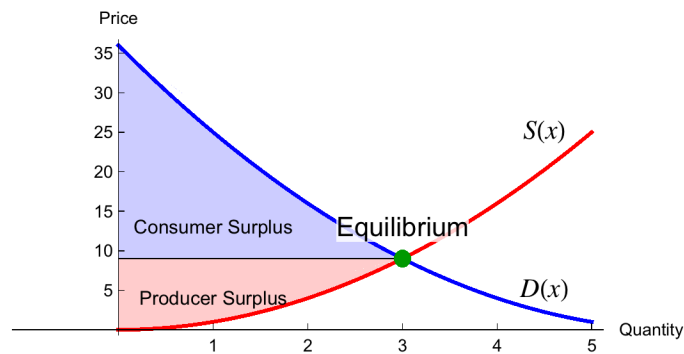
Producer Surplus



$$\text{Producer Surplus} = QP - \int_a^b S(x) dx$$

Example 2 Find the producers' surplus when the supply function is $S(x) = \frac{1}{10}x^2$ at a quantity of $x = 6$.

Putting these two together we get both the consumer and producer surplus, and the *free market equilibrium* price.



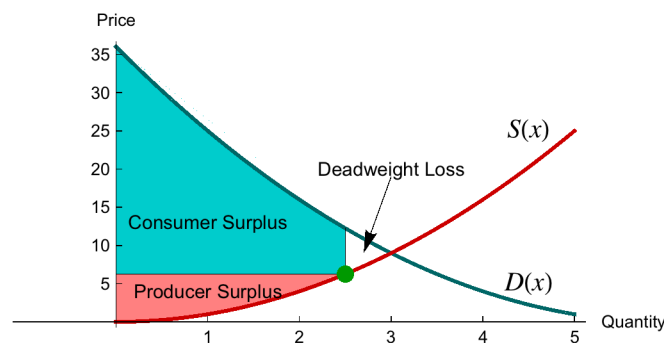
Example 3 Given the demand function $D(x) = (x - 6)^2$ and the supply function $S(x) = x^2$ find both the consumer surplus and the producer surplus.

Deadweight Loss

💡 When price is not set at the free market equilibrium point we get what is termed “dead weight loss”.

In economics, a deadweight loss (also known as excess burden or allocative inefficiency) is a loss of economic efficiency that can occur when equilibrium for a good or service is not optimal. In other words, either people who would have more marginal benefit than marginal cost are not buying the product, or people who have more marginal cost than marginal benefit are buying the product.

Causes of deadweight loss can include monopoly pricing (in the case of artificial scarcity), externalities, taxes or subsidies, and binding price ceilings or floors (including minimum wages). The term deadweight loss may also be referred to as the “excess burden” of monopoly or taxation.



Example 4 Calculate the deadweight loss for the supply and demand functions in Example 3 when the price is set at \$6.25 .