

Principles of Microeconomics  
Practice Problems for the Algebra of Taxes  
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D:  $P = 40 - Q$

S:  $P = Q$

Find the original equilibrium price and quantity.

$$40 - Q = Q$$

$$40 = 2Q$$

$$Q^* = 20$$

$$P^* = 20$$

Now suppose that a \$4 tax is imposed on this market so that the new, post-tax supply curve is

S:  $P = Q + 4$

- A) How much of the tax does the consumer pay?
- B) How much of the tax does the producer pay?
- C) How much tax revenue will the \$4 tax raise?
- D) How much deadweight loss will the tax create?

First, we need to find the new equilibrium price and quantity.

$$40 - Q = Q + 4$$

$$36 = 2Q$$

$$Q^{**} = 18$$

$$P^{**} = 40 - 18 = 22$$

So, the consumer used to pay \$20 and now pays \$22.

- A) Thus, the consumer pays \$2 of the \$4 tax.
- B) The remaining \$2 (\$4 - \$2) must be paid by the producer.
- C) Total revenue equals the amount of the tax (\$4) multiplied by the post-tax quantity (18) =  
 $\$4 \times 18 = \$72$ .
- D) Deadweight loss equals  $\frac{1}{2} \times \text{base} \times \text{height}$ . The base is the difference between the original quantity and the post-tax quantity. The height is the amount of the tax. So, deadweight loss equals  $\frac{1}{2} \times (20 - 18) \times \$4 = \frac{1}{2} \times 2 \times \$4$ .