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 \( \frac{1}{2} \times (20 - 18) \times $4 = \frac{1}{2} \times 2 \times $4 \).