

HW §8.4 Numbers 2,4,10,12,14

2.

$$\int_{1000}^{5000} 12 - 0.0004x \, dx = 12x - 0.0002x^2 \Big|_{1000}^{5000} = 60,000 - 12,500 - 12,000 + 200 = 35,700$$

Thus, the revenue for producing the first 5,000 units is the revenue for producing the first 1,000 plus the revenue for producing the next 4,000, which we just calculated. Thus in total we have a revenue of $\$12,400 + \$35,700 = \$50,100$.

4. The consumer surplus will be:

$$\begin{aligned} & \int_0^{25} \frac{450}{x+8} - 10 \, dx \\ &= 450 \ln|x+8| - 110x \Big|_0^{25} \\ &= 450 \ln(33) - 250 - 450 \ln(8) \end{aligned}$$

10.

The demand function is

$$p = 10.25 - \frac{5}{70}x$$

So, consumer surplus when the price is \$6.00 is:

$$\begin{aligned} & \int_0^{505} 10.25 - \frac{5}{70}x - 6 \, dx \\ &= 4.25x - \frac{1}{28}x^2 \Big|_0^{505} \end{aligned}$$

12.

$$\begin{aligned} & \int_5^9 2200 + 10e^{0.8t} \, dt \\ &= 2200t + 8e^{0.8t} \Big|_5^9 \\ &= 8800 + 8(e^{7.2} - e^4) \end{aligned}$$

14. I did this one in class.