

Problem Definition

Problem 49. **Revenue** Two models, R_1 and R_2 , are given for the revenue (in billions of dollars per year) for a large corporation. Both models are estimates of revenues for 2004-2008, with $t = 4$ corresponding to the year 2004. Which model is projecting the greatest revenue? How much more revenue does that model project for the four year period?

$$R_1(t) = 7.21 + 0.58t, \quad R_2(t) = 7.21 + 0.45t$$

Solution Step 1:

The means for answering this question is to determine the area between the revenue curves from $t = 4$ to $t = 8$. The first function will be above the second revenue function for any $t \geq 0$. The difference in the revenue functions is

$$\begin{aligned} \text{Difference in revenue} &= \int_4^8 (R_1(t) - R_2(t)) dt \\ &= \int_4^8 ((7.21 + 0.58t) - (7.21 + 0.45t)) dt \\ &= \int_4^8 (0.13)t dt \\ &= (0.13) \int_4^8 t dt \\ &= (0.13) \left(\frac{1}{2}t^2 \right) \Big|_4^8 \\ &= (0.13) \left(\frac{1}{2}(8)^2 \right) - (0.13) \left(\frac{1}{2}(4)^2 \right) \\ &= 3.12 \end{aligned}$$

So, the difference in the models is \$3.12 billion.