

Section 6.5 HW Notes

1, 7, 10, 13, 15, 17

For the odd problems, I'll just give the set ups.

7. Notice that the problem is set up for u, du substitution.

10. This one summarizes this section nicely. Let $f = 1/x$ on $[1, 3]$.

(a) First, find the average value of f :

$$\frac{1}{3-1} \int_1^3 \frac{1}{x} dx = \frac{1}{2} \ln |x| \Big|_1^3 = \frac{1}{2} \ln(3)$$

(b) Find the value of c guaranteed by the Mean Value Theorem for Integrals.

$$f(c) = f_{\text{avg}} \quad \Rightarrow \quad \frac{1}{c} = \frac{1}{2} \ln(3) \quad \Rightarrow \quad c = \frac{2}{\ln(3)} \approx 1.82$$

(c) Sketch: You might sketch the picture by hand.

13. If the integral given is 8, then the average value of f is

$$f_{\text{avg}} = \frac{1}{3-1} \int_1^3 f(x) dx = \frac{1}{2} \cdot 8 = 4$$

By the Mean Value Theorem for Integrals, there must be a c in $[1, 3]$ for which $f(c) = 4$.

15. Use geometry for the area.

17. The average temperature, using our formula, is the following, if we assume $t = 0$ corresponds to 9AM and $t = 12$ corresponds to 9PM.

$$\frac{1}{12-0} \int_0^{12} 50 + 14 \sin\left(\frac{\pi t}{12}\right) dt$$