Math 134 Managerial Calculus
Homework 17 Spring 2021

Due May 3, 2021

For problems #1-6, evaluate the definite integral by substitution either of two ways: keeping the limits of integration, or changing the limits of integration. Note: If you do it both ways, your answers should be the same.

1. $$\int_0^1 x^2(2x^3+2)\,dx$$

2. $$\int_1^2 (3x-2)^{\frac{3}{2}}\,dx$$

3. $$\int_0^2 \frac{x}{\sqrt{x^2+5}}\,dx$$

4. $$\int_0^2 x^2 e^{x^3}\,dx$$

5. $$\int_1^{e^2} \frac{\ln x}{x}\,dx$$

6. $$\int_0^{\ln 3} \frac{e^x}{1+e^x}\,dx$$

For problems #7 & 8, find the area of the region under the graph of f on $[a, b]$.

7. $$f(x) = x^3 + x;\ [0, 6]$$

8. $$f(x) = 3 + \frac{3}{2}\sqrt{x+2};\ [2, 7]$$

For problems #9 & 10, find the average value of the function over the indicated interval $[a, b]$

9. $$f(x) = x^3;\ [0, 2]$$

10. $$f(x) = \frac{1}{x+1};\ [0, e-1]$$

Challenge problem (You can get full credit on the homework if you skip this).

If you skipped any problems from #1-10, this problem won't be graded.

11. Find the total area of the region between the graph of $f(x) = x^3 - x^2 - 2x$ and the x-axis. Hint: Total area cannot be negative.