MATH 152 Assignment 3, Fall 2022.

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Webassign Exercises

6.5 Exercises 2, 9.

7.1 Exercises 1, 3, 11, 19, 28.
For 19 and 28 you need to apply integration by parts more than once.

7.2 Exercises 2, 10, 19, 41.

7.3 Exercises 4, 12, 15.
Use the integration tables in the textbook – see REFERENCE pages 6 and 7.

Written Exercises

1 (Section 6.5) Calculate the average of $f(x) = 1/x$ on $[1,3]$ and find a value c on $[1,3]$ such that $f(c)$ is the average.

2 (Section 7.1) Prove the reduction formula $\int (\ln x)^n dx = x(\ln x)^n - n \int (\ln x)^{n-1} dx$ by differentation! Then use it to calculate $\int (\ln x)^2 dx$. Now do Section 7.1 Exerise 65(b).

3 (Section 7.1) Calculate $\int x \sin x \cos x \, dx$.
Simplify the integrand then use integration by parts.

4 (Section 7.2) Two functions $f(x)$ and $g(x)$ are said to be orthogonal on $[a,b]$ if $\int_a^b f(x)g(x)dx = 0$. Show that $\sin 2x$ and $\cos 3x$ are orthogonal on $[-\pi, \pi]$.

5 (Section 7.2) Find the volume obtained by rotating $y = \sin x$ for $0 \leq x \leq \pi$ about the x axis.

6 Section 7.3 exercise 4. Use a trigonometric subsitution.

7 Section 7.3 exercise 12. Use a trigonometric substitution.

8 (Section 7.3) Calculate $\int_0^1 2x\sqrt{1-x^4}\, dx$. First use the substitution $u = x^2$. Then use a trigonometric substitution. You should get $\pi/4$.