The following written homework problems are due 6:00pm on 1/26 (Wednesday students) or 1/27 (Thursday students). You also have a WebWork assignment due two days before your class.

(3.1) Evaluate the definite integral: $\int_0^2 t^3\sqrt{9+t^4}\,dt$.

(3.2) Evaluate the indefinite integral: $\int \frac{e^{2x}}{(e^x+1)^2}\,dx$.

(3.3) (a) Prove $\int \frac{1}{x\ln x}\,dx = \ln(|\ln x|) + C$.

(b) Prove $\int_a^{a^2} \frac{1}{x\ln x}\,dx = \ln(2)$ for any $a > 1$.

(3.4) Professional Problem. Suppose f is continuous and $\int_1^4 f(x)\,dx = 7$.

(a) Calculate $\int_{-1}^2 xf(x^2)\,dx$.

(b) Calculate $\int_1^2 xf(x^2)\,dx$.

(c) Explain why your answers are the same. (Hint: what is $\int_{-1}^1 xf(x^2)\,dx$?)

As always, refer to the "Professional Problem Information" and the "Professional Problem Checklist" handouts to create a *professionally written* solution. This week, you should especially focus on including an explanation that follows the 3C's **(complete, concise, and correct)** and flows well with your mathematics. Are your steps appropriately justified? Does your explanation include extra details that are not relevant to the problem?

You should have questions!

When you do, here's what to do:

1. Post your question on Canvas.
2. Email *all* of the instructors with your question.
3. Write your solution (even if you're unsure about it) and bring it to the study session. Ask an instructor specific questions about it.

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