

Math 122 Exam 2 topics

These are some sample problems— for more examples, see your homework problems from the appropriate section. These sample problems are not meant to be exhaustive of what you should know from each section.

7.6: Trapezoid / Simpson's rules

- Estimate $\int_0^3 2x - 7 dx$ using 6 subintervals with Simpson's rule or trapezoid rule.
- Do trapezoid and Simpson's approximations for functions given by data points instead of formulas. (Like book problem 7.6 #22.)

8.1: Integration by parts

- $\int_0^1 (x^2 + 3x)e^x dx$
- $\int x \ln x dx$

(You will need to be able to decide whether to do u -substitution or integration by parts.)

8.2: Volumes of revolution and average value

- Find the volume of the shape obtained by revolving the curve $f(x) = \sqrt{e^x}$ around the x -axis from $x = 0$ to $x = 2$.
- Find the average value of $x^2(x - 1)$ from $x = 1$ to $x = 2$.

8.3: Continuous money flow

You should know the formulas for the present value and accumulated amount of a flow

The Wilson

If you integrate a product by integrating each factor separately, you will lose 5 points on the exam.

- For the money flow $f(x) = 50x$, compute the present value and accumulated amount of the flow over 5 years, assuming 2% annual continuous interest.

8.4: Improper integrals

- $\int_1^\infty 2x^{-3} - x^{-4} dx$
- $\int_{-\infty}^4 3x^2 dx$
- $\int_1^\infty e^{-x} dx$

Formulas and other stuff you should know

- Simple antiderivatives and integration, u -substitution
- Integration by parts formula: $\int u dv = uv - \int v du$
- Average value: $\frac{1}{b-a} \int_a^b f(x) dx$
- Volume of revolution: $V = \int_a^b \pi(f(x))^2 dx$
- Present value: $P = \int_0^t f(x)e^{-rx} dx$
- Accumulated amount: $A = e^{rt} \int_0^t f(x)e^{-rx} dx$