MAT137

- Last time: Integration by substitution:
  "the Chain Rule"

- Today: Integration by parts: "the Product Rule"

- Term test 3: Friday, February 10, 4-6pm.

- Homework before Wednesday's class: watch videos 9.7, as well as 9.8, 9.9.

Computation practice: Integration by parts

Use integration by parts (possibly in combination with other methods) to compute:

1. $\displaystyle\int xe^{-2x}\,dx$
2. $\displaystyle\int x^2 \sin x\,dx$
3. $\displaystyle\int \ln x\,dx$
4. $\displaystyle\int x \arctan x\,dx$
5. $\displaystyle\int \sin\sqrt{x}\,dx$
6. $\displaystyle\int x^2 \arcsin x\,dx$
7. $\displaystyle\int e^{\cos x}\sin^3 x\,dx$
8. $\displaystyle\int e^{ax}\sin(bx)\,dx$

Persistence

Compute

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There is a more efficient approach. Call

$$I_n = \int_1^e (\ln x)^n\,dx$$

Use integration by parts on I_n. You will get an equation with I_n and I_{n-1}. Now solve the previous questions.

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The following function is tabulated.

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2. $\displaystyle\int_0^x t^2 e^{-t^2}\,dt$
3. $\displaystyle\int_0^x e^{-2t^2}\,dt$

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3. $\displaystyle\int_0^x e^{-2t^2} dt$
4. $\displaystyle\int_0^1 e^{-t^2+6t} dt$
5. $\displaystyle\int_{x_1}^{x_2} e^{-\frac{(t-\mu)^2}{\sigma^2}} dt$
6. $\displaystyle\int_0^x \frac{e^{-t}}{\sqrt{t}} dt$