MAT137

(Section L0501, January 27, 2020)

- **Fot today's lecture: slides 9.5-9.9**
- **For next day's lecture, watch videos 9.10, 9.11, 9.12, 9.15, 9.16, 9.17 .**
- Contents: Integration by parts.

Warm up

- State (roughly) the formula for integration by parts

Computation practice: Integration by parts

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

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

Persistence (Solve as an exercise)

Compute

- $\int_1^e (\ln x)^4 \, dx$

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.