

Questions for recitation 22 January 2021

1. Match the following integrals to their solutions *and know how to derive those solutions*:

$$(a) \int \tan(u) du \quad (1) \frac{a^u}{\ln(a)} + C$$

$$(b) \int \frac{du}{\sqrt{a^2 - u^2}} \quad (2) \frac{1}{a} \tan^{-1} \left(\frac{u}{a} \right) + C$$

$$(c) \int \frac{du}{a^2 + u^2} \quad (3) \ln |\sin(u)| + C$$

$$(d) \int \cot(u) du \quad (4) \frac{1}{a} \sec^{-1} \left(\frac{u}{a} \right) + C$$

$$(e) \int a^u du \quad (5) \sin^{-1} \left(\frac{u}{a} \right) + C$$

$$(f) \int \frac{du}{u\sqrt{u^2 - a^2}} \quad (6) -\ln |\cos(u)| + C$$

2. Evaluate $\int \frac{\sqrt{9-w^2}}{w^2} dw$

3. Evaluate the integral $\int \frac{t}{\sqrt{4t^2-1}} dt$:

- (a) Using a trig substitution
- (b) Without using a trig substitution

Are your answers the same?

4. Evaluate $\int \frac{3x^2+1}{(x^2-9)^{3/2}} dx$. Simplify your answer as far as possible.

5. Evaluate $\int \frac{1}{x\sqrt{4x^2+16}} dx$

6. Evaluate $\int_{-2}^0 x(-x^2 - 4x)^{3/2} dx$. (Hint: Start with dealing with the “1/2” exponent by completing the square.)