

NCEA Level 3 Calculus (Integration)

25. Integration Revision (Homework)

Reading

Go and watch...

https://www.youtube.com/watch?v=iGI_LLb3rgg

Questions

1. Compute the following integrals.

(a) $\int_1^2 \sin x \, dx$

(b) $\int \frac{u^2+1}{u^3+3u} \, du$

(c) $\int_0^{\pi/6} \tan x \, dx$

2. Suppose $y'(x) = \frac{3x^2+4x-4}{2y(x)-4}$ and $y(1) = 3$. Compute the possible values of y when x is 2.

3. Let $\omega(a, x) = \int_0^x \frac{a^3}{t^2+a^2} \, dt$.

(a) Find $\omega(a, x)$ explicitly in terms of a and x . You may wish to use the substitution $t = a \tan \theta$.

(b) Compute $\omega(2, 2)$ exactly.

(c) Find x such that $\omega(\sqrt{3}, x) = \pi$.

4. Scholarship 2016: Compute the following integral, giving your answer in exact form.

$$\int_{-\pi/2}^{\pi/2} (\sin^5 x + \cos^5 x) \, dx$$