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) $\int_1^2 \sin x \, \mathrm{d}x$
   (b) $\int \frac{u^2+1}{u^3+3u} \, \mathrm{d}u$
   (c) $\int_0^{\pi/6} \tan x \, \mathrm{d}x$
2. Suppose $y'(x) = \frac{3x^2+4x-4}{2y(x)-4}$ and $y(1) = 3$. Find $y(x)$ explicitly.
3. Let $\omega(a, x) = \int_0^x \frac{a^3}{t^2+a^2} \, \mathrm{d}t$.
   (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.

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