NCEA Level 3 Calculus (Differentiation)
13. Inverse Functions (Homework)

Reading

https://blogs.scientificamerican.com/roots-of-unity/dont-fall-for-babylonian-trigonometry-hype/

Questions

1. Find the derivatives with respect to x:
   (a) $y = \tan^{-1}(x^2)$
   (b) $\tan f(x) = x$
   (c) $g(x) = \arctan(\arcsin\sqrt{x})$
2. Show that
$$\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{1}{2}\tan^{-1}x + \frac{1}{4}\ln\frac{(x+1)^2}{x^2+1}\right) = \frac{1}{(1+x)(1+x^2)}$$
3. Prove that $\frac{\mathrm{d}}{\mathrm{d}x}\cot^{-1}x = -\frac{1}{x^2+1}$.