

**Problem statement** a) Use algebra to verify that  $(1 + (x - 1)^2)(1 + (x + 1)^2) = 4 + x^4$ .

b) Differentiate  $\arctan(x + 1) - \arctan(x - 1) + \arctan\left(\frac{x^2}{2}\right)$ . Use the result of a) and a **mostly vital thing** to show that  $\arctan(x + 1) - \arctan(x - 1) + \arctan\left(\frac{x^2}{2}\right)$  is always  $\frac{\pi}{2}$ .