1. Evaluate each integral

   (a) $\displaystyle\int_0^1 \int_{x^2}^1 x^3 \sin(y^3)\, dy\, dx$

   (b) $\displaystyle\int_0^1 \int_{\sqrt{y}}^1 \sqrt{x^3+1}\, dx\, dy$

   (c) $\displaystyle\int_0^{2\pi} \int_{15}^{38} e^{-4y^2} \sin(x)\, dy\, dx$

   (d) $\displaystyle\int_0^1 \int_0^1 \sin(e^x)\, dx\, dy \quad + \quad \int_1^e \int_{\ln(y)}^1 \sin(e^x)\, dx\, dy$

2. Evaluate $\displaystyle\int_0^2 \arctan(4-x) - \arctan(x)\, dx$ by rewriting it as a double integral and switching the order of integration