

(d)  $f(x) = \sinh(a \ln(x))$ . Show that

$$f'(x) = \frac{a}{2x}(x^a + x^{-a}).$$

$$f'(x) = \cosh(a \ln(x)) \cdot \left(\frac{a}{x}\right)$$

$$= \frac{e^{a \ln(x)} + e^{-a \ln(x)}}{2} \cdot \frac{a}{x}$$

$$= \frac{(e^{\ln(x)})^a + (e^{\ln(x)})^{-a}}{2} \cdot \frac{a}{x}$$

$$= \frac{a}{2x} \cdot (x^a + x^{-a}).$$