

Exercise 19. Differentiation of hyperbolic functions

In Problems 1 to 5 differentiate the given functions with respect to the variable:

1. (a) $3 \operatorname{sh} 2x$ (b) $2 \operatorname{ch} 5\theta$ (c) $4 \operatorname{th} 9t$

2. (a) $\frac{2}{3} \operatorname{sech} 5x$ (b) $\frac{5}{8} \operatorname{cosech} \frac{t}{2}$ (c) $2 \operatorname{coth} 7\theta$

3. (a) $2 \ln(\operatorname{sh} x)$ (b) $\frac{3}{4} \ln\left(\operatorname{th}\left(\frac{\theta}{2}\right)\right)$

4. (a) $\operatorname{sh} 2x \operatorname{ch} 2x$ (b) $3e^{2x} \operatorname{th} 2x$

5. (a) $\frac{3 \operatorname{sh} 4x}{2x^3}$ (b) $\frac{\operatorname{ch} 2t}{\cos 2t}$