

**Exercise 24**

Find the derivative of the function.

$$f(t) = 2^{t^3}$$

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**Solution**

Rewrite the function first.

$$f(t) = e^{\ln 2^{t^3}} = e^{t^3 \ln 2} = e^{(\ln 2)t^3}$$

Then take the derivative using the chain rule.

$$\begin{aligned} f'(t) &= \frac{df}{dt} = \frac{d}{dt} \left[ e^{(\ln 2)t^3} \right] \\ &= e^{(\ln 2)t^3} \cdot \frac{d}{dt} [(\ln 2)t^3] \\ &= e^{(\ln 2)t^3} \cdot [3(\ln 2)t^2] \\ &= 3(\ln 2)t^2 e^{(\ln 2)t^3} \end{aligned}$$