

### Practice with the Product and Quotient Rules

Find the derivatives of the following functions.

1)  $f(x) = e^\pi + \pi^e + \sqrt{x} \cdot 2^x$

2)  $g(t) = \frac{t^2 \sin(2t)}{\ln(5t)}$

3)  $w(s) = \frac{\cos(\sqrt{\pi}) \tan(s+1)}{\arctan(2s)}$

4) Let  $f(x) = e^x \cdot \cos(x)$

i) Find an equation of the tangent line to  $f$  at  $x = 0$ .

ii) Find all the critical points of  $f$ .

iii) Determine all local extrema of  $f$ .