Quiz 7 MTH 140 Fall 2026

Monday, October 12, 2026 4:07 PM

find tangent line to $f(x)=\frac{e^x+1}{x^2+1}$ at $x=2$

Soln: First find

$$y_0 = f(2) = \frac{e^2+1}{2^2+1} = \frac{e^2+1}{5}$$

To find slope, use quotient rule to compute

$$f'(x) = \frac{(x^2+1)\frac{d}{dx}[e^x+1] - (e^x+1)\frac{d}{dx}[x^2+1]}{(x^2+1)^2}$$

$$= \frac{(x^2+1)e^x - (e^x+1)(2x)}{(x^2+1)^2}$$

So at our point, we have slope

$$m = f'(2) = \frac{(2^2+1)e^2 - (e^2+1)(2\cdot 2)}{(2^2+1)^2}$$

$$= \frac{5e^2 - 4(e^2+1)}{5^2}$$

$$= \frac{5e^2}{5^2} - \frac{4}{5^2}(e^2+1)$$

$$= \frac{5}{25}e^2 - \frac{4}{25}e^2 - \frac{4}{25}$$

$$= \frac{1}{25}e^2 - \frac{4}{25}$$

So tangent line has equation

$$y - \frac{e^2+1}{5} = \left[\frac{1}{25}e^2 - \frac{4}{25}\right](x-2)$$