Quiz 8 MTH 140 Fall 2026

Monday, October 12, 2026 4:13 PM

find ten line to $f(x) = \ln(x^2+1)$ at $x = 2$

Soln: Find point

$$y_0 = f(2) = \ln(2^2+1) = \ln(5)$$

To find slope, use chain rule to compute

$$f'(x) = \frac{d}{dx}\ln(x^2+1) \overset{\text{chain rule}}{=} \frac{d}{dx}[x^2+1] \boxed{\frac{d}{d(x^2+1)}\ln(x^2+1)}$$

$$= \frac{2x}{x^2+1}$$

$$\frac{d}{d\star}\ln(\star) = \frac{1}{\star}$$

$$\downarrow \star = x^2+1$$

$$\frac{d}{d(x^2+1)}\ln(x^2+1) = \frac{1}{x^2+1}$$

Thus our slope is

$$m = f'(2) = \frac{2(2)}{2^2+1} = \frac{4}{5}$$

So tangent line has eqt

$$\boxed{y - \ln(5) = \frac{4}{5}(x-2)}$$