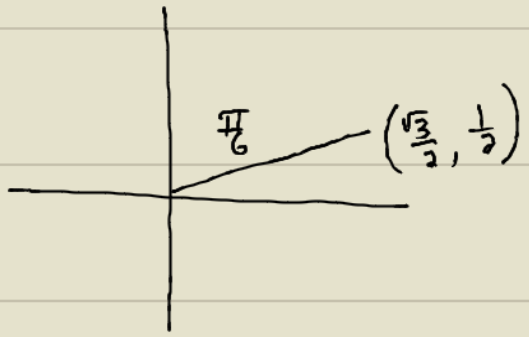
16. $f(x) = \csc x \qquad \left(\frac{\pi}{6}, 2\right)$ (x, y)

FIND EQUATION OF TANGENT LINE



① FIND DERIVATIVE

$$f'(x) = -\csc x \cot x$$

② CHANGE f' TO m AND PLUG IN x PART OF POINT

$$m = -\csc \frac{\pi}{6} \cot \frac{\pi}{6}$$

"$\frac{1}{y}$" "$\frac{x}{y}$"

$$m = -\left(\frac{1}{\frac{1}{2}}\right)\left(\frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}}\right)$$

$$m = -2\sqrt{3}$$

③ PLUG IN m FROM STEP ② AND GIVEN POINT FOR x, y INTO $y = mx + b$ AND SOLVE FOR b

$$y = mx + b$$

$$2 = -2\sqrt{3}\left(\frac{\pi}{6}\right) + b$$

$$2 = \frac{-2\sqrt{3}\pi}{6} + b$$

$$2 = \frac{-\sqrt{3}\pi}{3} + b$$

$$2 + \frac{\sqrt{3}\pi}{3} = b$$

$$\frac{6 + \sqrt{3}\pi}{3} = b$$

④ WRITE ANSWER

$$y = mx + b$$

$$y = -2\sqrt{3}x + \frac{6 + \sqrt{3}\pi}{3}$$