1. \[ \lim_{x \to 1^-} (2 - x)\tan\left(\frac{\pi x}{2}\right) \]

2. \[ \lim_{x \to 0^+} [\cot(2x)(\tan^{-1} 3x)] \]
3. Find the interval(s) where the function $f(x) = e^x - x^2$ is concave-down

4. Find the area (in units$^2$) of the largest rectangle that could be inscribed in a semi-circle of radius 1