

(1)[5 points] Simplify

$$\sin(\tan^{-1}(x))$$

Your answer should not contain any trigonometric functions.

(2)[5 points] Find the derivative of

$$y = \tan^{-1} \sqrt{x}$$

(3)[5 points] Find

$$\lim_{x \rightarrow -1^+} \sin^{-1} x$$