Common Calculus Mistakes

Derivative of inverse tangent

The Goal

Find

$$\frac{d}{dx}\arctan(x)$$

The Mistake

Find the mistake:

$$\frac{d}{dx}\arctan(x) = \frac{1}{x\sqrt{x^2-1}}$$

Need a hint? Look carefully at the red part:

$$\frac{d}{dx}\arctan(x) = \frac{1}{x\sqrt{x^2-1}}$$

The Correction

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

An Explanation

The student has not learned the correct derivative formula for inverse tangent (the formula in the mistake is either close to the derivative of the inverse secant, or is actually the derivative of inverse secant, depending on the choice of range made in the definition of the inverse secant function).