

## Calculus II

# Simplify basic trigonometric functions evaluated on basic inverse trigonometric functions

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## Example

Find  $\tan \left( \arcsin \left( \frac{1}{3} \right) \right)$ .

- Let  $\theta = \arcsin \left( \frac{1}{3} \right)$ , so  $\sin \theta = \frac{1}{3}$ .
- Draw a right triangle with opposite side 1 and hypotenuse 3.
- Let the angle  $\theta$  be as labeled. Then  $\sin \theta = \frac{1}{3}$  and so  $\theta = \arcsin \left( \frac{1}{3} \right)$ .
- Length of adjacent side  $= \sqrt{3^2 - 1^2} = \sqrt{8} = 2\sqrt{2}$ .
- Then  $\tan \left( \arcsin \left( \frac{1}{3} \right) \right) = \frac{1}{2\sqrt{2}}$ .

