Calculus II

Simplify basic trigonometric functions evaluated on basic inverse trigonometric functions

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2019

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 θ 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 $\tan\left(\arcsin\left(\frac{1}{3}\right)\right) = \frac{1}{2\sqrt{2}}$.