3.3) Differentiating inverse trigonometric functions

Worked example

Find:

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

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

Your turn

Find:

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

$$-\frac{1}{\sqrt{1-x^2}}$$

Worked example

Find:

$$\frac{d}{dx}(\arccos x^4)$$

$$\frac{d}{dx}(\arctan 2x^3)$$

Your turn

Find:

$$\frac{d}{dx}(\arcsin x^2)$$

$$\frac{2x}{\sqrt{1-x^4}}$$

Worked example

Find:

$$\frac{d}{dx}(\operatorname{arcsec} 3x)$$

Your turn

Find:

$$\frac{d}{dx}(\operatorname{arcsec} 2x)$$

$$\frac{1}{x\sqrt{4x^2-1}}$$

Worked example

Given that $y = \arctan\left(\frac{1+x}{1-x}\right)$, find $\frac{dy}{dx}$

Your turn

Given that $y = \arctan\left(\frac{1-x}{1+x}\right)$, find $\frac{dy}{dx}$

$$-\frac{1}{1+x^2}$$

Worked example

Prove:

$$\cos(\arctan x) = \frac{1}{\sqrt{1+x^2}}$$

Your turn

Prove:

$$\sin(\operatorname{arcsec} x) = \sqrt{1-\frac{1}{x^2}}$$

Proof