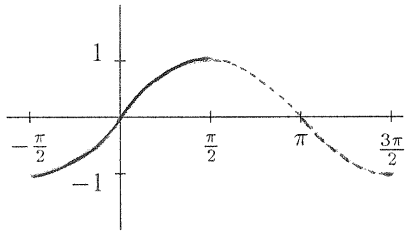
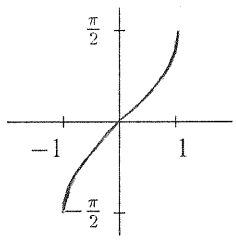
MATH 12002
Inverse Trigonometric Functions

1. $f(x) = \sin x$, Domain=$[-\frac{\pi}{2}, \frac{\pi}{2}]$, Range=$[-1, 1]$.



$f^{-1}(x) = \sin^{-1} x = \arcsin x$, Domain=$[-1, 1]$, Range=$[-\frac{\pi}{2}, \frac{\pi}{2}]$.



$$\boxed{\frac{d}{dx} \arcsin x = \frac{1}{\sqrt{1 - x^2}}}$$

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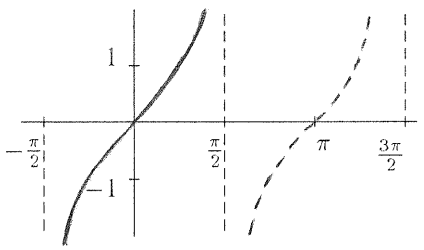
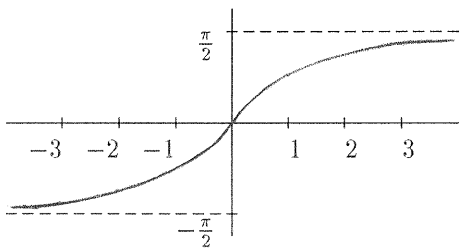
2. $f(x) = \tan x$, Domain=$(-\frac{\pi}{2}, \frac{\pi}{2})$, Range=$(-\infty, \infty)$.

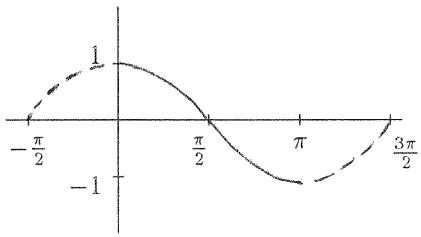


$f^{-1}(x) = \tan^{-1} x = \arctan x$, Domain=$(-\infty, \infty)$, Range=$(-\frac{\pi}{2}, \frac{\pi}{2})$.

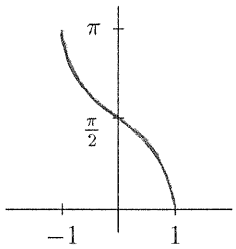


$$\boxed{\frac{d}{dx} \arctan x = \frac{1}{1 + x^2}}$$

3. $f(x) = \cos x$, Domain=$[0, \pi]$, Range=$[-1, 1]$.



$f^{-1}(x) = \cos^{-1} x = \arccos x$, Domain=$[-1, 1]$, Range=$[0, \pi]$.



$$\boxed{\frac{d}{dx} \arccos x = -\frac{1}{\sqrt{1-x^2}}}$$

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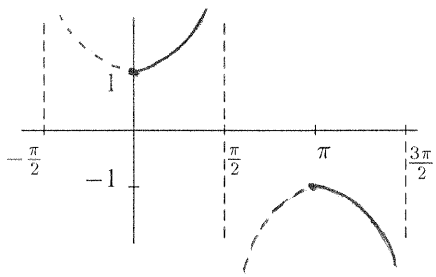
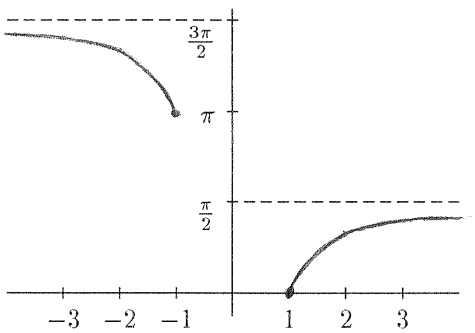
4. $f(x) = \sec x$, Domain=$[0, \frac{\pi}{2}) \cup [\pi, \frac{3\pi}{2})$, Range=$(-\infty, -1] \cup [1, \infty)$.



$f^{-1}(x) = \sec^{-1} x = \operatorname{arcsec} x$, Domain=$(-\infty, -1] \cup [1, \infty)$, Range=$[0, \frac{\pi}{2}) \cup [\pi, \frac{3\pi}{2})$.



$$\boxed{\frac{d}{dx} \operatorname{arcsec} x = \frac{1}{x\sqrt{x^2-1}}}$$