7.6 INVERSE TRIGONOMETRIC FUNCTIONS

Part II 7.6 II #s 51, 58, 60, 64, 70

$\frac{d}{dx}\left[\tan^{-1}x\right] = \frac{1}{x^2+1}$

60. $\int \frac{\tan^{-1}x}{1+x^2}\,dx$ $= \int u\,du = \frac{u^2}{2} + C$

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

$= \frac{1}{2}(\tan^{-1}(x))^2 + C$

Let $u = \tan^{-1}x$

$du = \frac{1}{1+x^2}dx$

$\int \frac{du}{u} = \ln|u| + C$

63. $\int \frac{1+x}{1+x^2}\,dx = \int \frac{1}{1+x^2}dx + \frac{1}{2}\int \frac{2x}{1+x^2}dx$

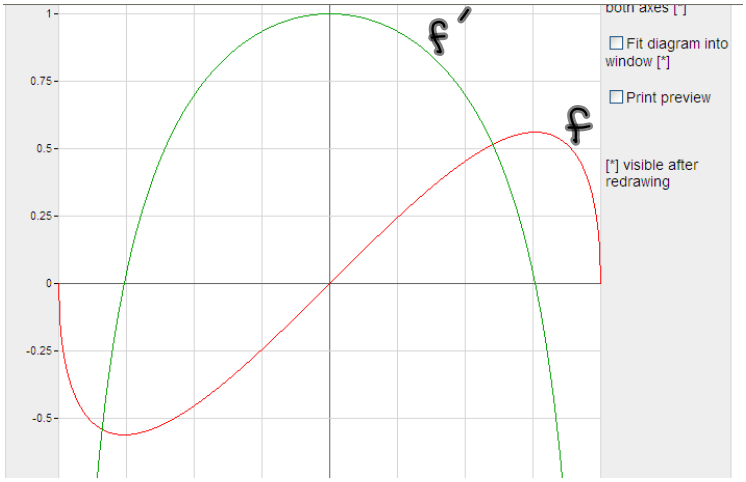
$u = 1+x^2$

$du = 2x\,dx$

$= \tan^{-1}(x) + \ln|1+x^2| + C$

15–16 Graph the given functions on the same screen. How are these graphs related?

15. $y = \sin x, \ -\pi/2 \leq x \leq \pi/2; \quad y = \sin^{-1}x; \quad y = x$



-1 0 1

sqr(1-x^2)*asin(x)
1-x*asin(x)/sqr(1-x^2)

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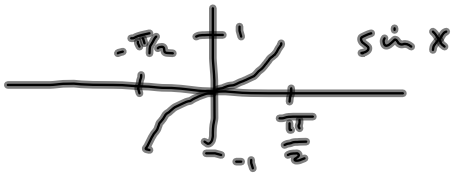
10 $y = \csc^{-1}x \ (|x| \geqslant 1) \iff \csc y = x$ and $y \in (0, \pi/2] \cup (\pi, 3\pi/2]$

$y = \sec^{-1}x \ (|x| \geqslant 1) \iff \sec y = x$ and $y \in [0, \pi/2) \cup [\pi, 3\pi/2)$

$y = \cot^{-1}x \ (x \in \mathbb{R}) \iff \cot y = x$ and $y \in (0, \pi)$

43–46 Find the limit.



43. $\lim_{x \to -1^+} \sin^{-1}x = -\frac{\pi}{2}$