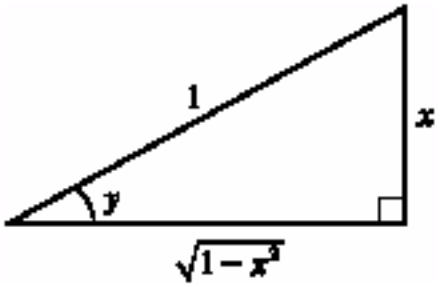
5. (a) $\sin(\sin^{-1}(0.7)) = 0.7$ since 0.7 is in $[-1, 1]$.

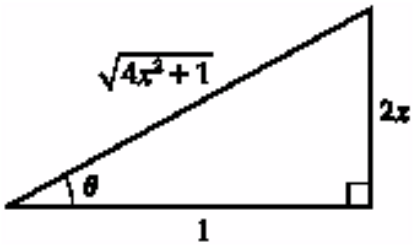
(b) $\tan^{-1}\left(\tan\frac{4\pi}{3}\right) = \tan^{-1}\sqrt{3} = \frac{\pi}{3}$ since $\frac{\pi}{3}$ is in $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$.

8. Let $y = \sin^{-1} x$. Then $\sin y = x$, so from the triangle we see that $\tan(\sin^{-1} x) = \tan y = \dfrac{x}{\sqrt{1-x^2}}$.



10. Let $\theta = \arctan 2x$. Then $\tan\theta = 2x$, so from the diagram we see that

$\csc(\arctan 2x) = \csc\theta = \dfrac{\sqrt{4x^2+1}}{2x}$.



20. $f(x) = x\ln(\arctan x) \;\Rightarrow\; f'(x) = x\cdot\dfrac{1}{\arctan x}\cdot\dfrac{1}{1+x^2} + \ln(\arctan x)\cdot 1 = \dfrac{x}{(1+x^2)\arctan x} + \ln(\arctan x)$

23. $y = \cos^{-1}(e^{2x}) \;\Rightarrow\; y' = -\dfrac{1}{\sqrt{1-(e^{2x})^2}}\cdot\dfrac{d}{dx}\left(e^{2x}\right) = -\dfrac{2e^{2x}}{\sqrt{1-e^{4x}}}$

38. Let $t = \ln x$. As $x \to 0^+$, $t \to -\infty$. $\lim\limits_{x\to 0^+} \tan^{-1}(\ln x) = \lim\limits_{t\to-\infty} \tan^{-1} t = -\frac{\pi}{2}$ by (8).