HW 11

7.6 #22. $y = \sqrt{\tan^{-1} x}$

$$y' = \frac{1}{2}\left(\tan^{-1} x\right)^{-1/2} \cdot \frac{1}{1+x^2}$$

40. $y = 3\arccos\left(\frac{x}{2}\right)$

Find equation of the tangent line at $(1, \pi)$

$y' = 3 \cdot \left(-\frac{1}{\sqrt{1-\left(\frac{x}{2}\right)^2}}\right) \cdot \frac{1}{2}$

At $x = 1$, $y' = -\frac{3}{2} \cdot \frac{1}{\sqrt{\frac{3}{4}}} = -\sqrt{3}$

The tangent line is: $y - \pi = -\sqrt{3}(x-1)$

7.7 #4 (a) $\cosh 3 = \frac{e^3 + e^{-3}}{2}$

(b) $\cosh(\ln 3) = \frac{e^{\ln 3} + e^{-\ln 3}}{2} = \frac{3 + \frac{1}{3}}{2} = \frac{10}{6} = \frac{5}{3}$

42. $y = x^2 \sinh^{-1}(2x)$

$$y' = 2x \sinh^{-1}(2x) + x^2 \cdot \frac{1}{\sqrt{1+4x^2}} \cdot 2$$

60. $\int \tanh x\, dx = \int \frac{\sinh x}{\cosh x}\, dx$

$u = \cosh x$

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

$$= \ln(\cosh x) + C$$