(21) $f(x) = 1 + \sqrt{2+3x}$

$y = f(x) = 1 + \sqrt{2+3x}$, $y \geq 1$

$y - 1 = \sqrt{2+3x}$

$(y-1)^2 = 2 + 3x$

$(y-1)^2 - 2 = 3x$

$\frac{(y-1)^2 - 2}{3} = x$

$f^{-1}(x) = \frac{1}{3}(x-1)^2 - \frac{2}{3}$, $x \geq 1$

(22) $y = f(x) = \frac{4x-1}{2x+3}$

(a) $\log_{10} 40 + \log_{10} 2.5 = \log_{10}((40)(2.5))$

$= \log_{10} 100$

$= \log_{10} 10^2$

$= \frac{2}{1} \log_{10} 10$

$= 2$

(b) $\log_8 60 - \log_8 3 - \log_8 5 = \log_8 \frac{60}{3} - \log_8 5$

$= \log_8 20 - \log_8 5$

$= \log_8 \frac{20}{5} = \log_8 4 = \log_{2^3} 2^2$

$= \frac{2}{3}$

(a) $e^{7-4x} = 6 \iff \ln e^{7-4x} = \ln 6$

$\iff (7-4x)\ln e = \ln 6$

$\iff 7-4x = \ln 6$

$\iff 7 - \ln 6 = 4x$

$\iff \frac{7}{4} - \frac{1}{4}\ln 6 = x$

(b) $\ln(3x-10) = 2 \iff e^{\ln(3x-10)} = e^2$

$\iff 3x-10 = e^2$

$\iff 3x = 10 + e^2$

$\iff x = \frac{10}{3} + \frac{e^2}{3}$

$= \frac{1}{3}(10 + e^2)$

(a) $1 < e^{3x-1} < 2 \Rightarrow \ln 1 < \ln e^{3x-1} < \ln 2$

$\Rightarrow 0 < 3x-1 < \ln 2$

$\Rightarrow 1 < 3x < 1 + \ln 2$

$\Rightarrow \frac{1}{3} < x < \frac{1}{3}(1 + \ln 2)$

(b) $1 - 2\ln x < 3 \Rightarrow 1 - 3 < 2\ln x$

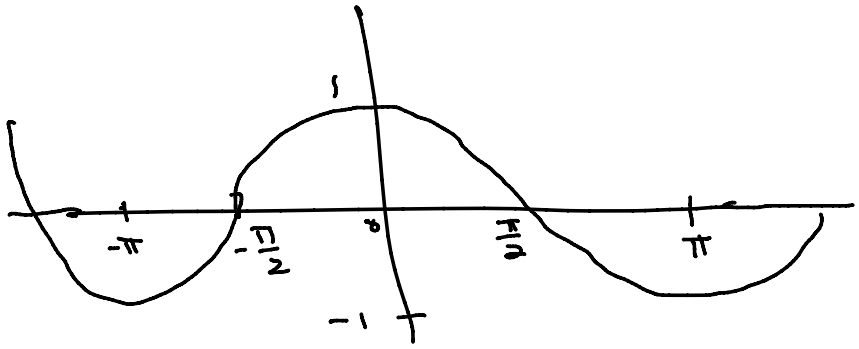
$\Rightarrow -2 < 2\ln x$

$\Rightarrow -1 < \ln x$

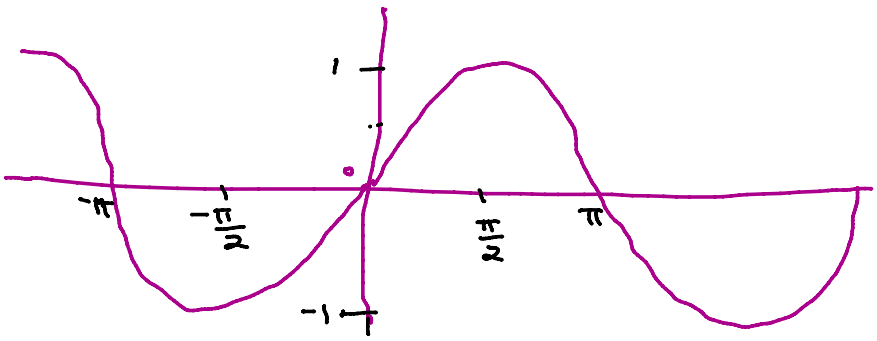
$\Rightarrow e^{-1} < e^{\ln x} = x$

$\Rightarrow e^{-1} < x$ or $x > e^{-1}$ //

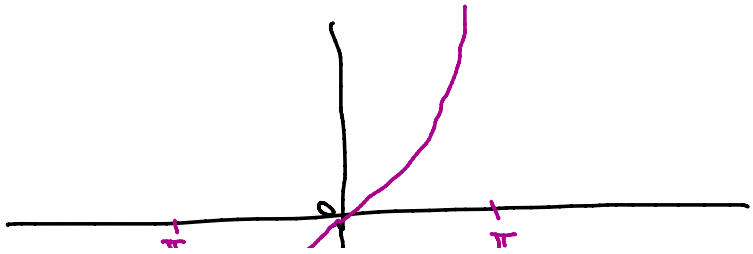
63 (a) $\cos^{-1}(-1) = \pi$ since $\cos\pi = -1$ and $\cos\theta$ is assumed 1-1 on $[0, \pi]$.

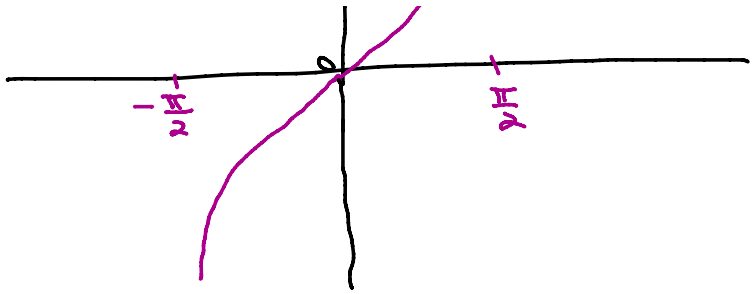


(b) $\sin^{-1}(0.5) = \frac{\pi}{6}$ since $\sin\frac{\pi}{6} = 0.5$ and $\sin\theta$ is 1-1 on $[-\frac{\pi}{2}, \frac{\pi}{2}]$



64 (c) $\tan^{-1}\sqrt{3} = \frac{\pi}{3}$ since $\tan\frac{\pi}{3} = \sqrt{3}$ and $\tan\theta$ is assumed 1-1 on $(-\frac{\pi}{2}, \frac{\pi}{2})$





(b) $\arctan(-1) = -\frac{\pi}{4}$ since $\tan\left(-\frac{\pi}{4}\right) = -1$ and $\tan\theta$ is assumed 1-1 on $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$