

Quiz 1 (Lectures 1,2,3)

Be sure to show your work for full credit!

1. Find the exact value of the following expression.

$$\tan^{-1}(\sqrt{3})$$

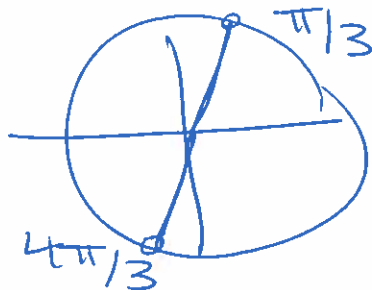
$$\text{Let } \tan^{-1}(\sqrt{3}) = \theta.$$

$$\tan^{-1}(\sqrt{3}) = \theta \text{ if \& only if } \tan \theta = \sqrt{3} \text{ and } -\frac{\pi}{2} < \theta < \frac{\pi}{2}$$

$$\tan \theta = \sqrt{3} \text{ when } \theta = \frac{\pi}{3} \text{ or } \frac{4\pi}{3}.$$

$$\text{Since } -\frac{\pi}{2} < \theta < \frac{\pi}{2}, \text{ then } \theta = \frac{\pi}{3}.$$

$$\text{So, } \tan^{-1}(\sqrt{3}) = \theta = \frac{\pi}{3}.$$



$$\tan^{-1}(\sqrt{3}) = \underline{\frac{\pi}{3}}$$

2. If $f(x) = 1 + e^{\frac{1}{2}x}$, then find $f^{-1}(2)$.Find $f^{-1}(2)$

$$\text{Let } f^{-1}(2) = y. \text{ Then } f(y) = 2.$$

$$\text{So, } 1 + e^{\frac{1}{2}y} = 2$$

$$\text{If } y = 0, \text{ then } 1 + e^{\frac{1}{2}(0)} = 1 + e^0 = 1 + 1 = 2$$

$$\text{So, } f^{-1}(2) = y = 0 \quad f^{-1}(2) = \underline{0}$$

Continue onto the back and complete Question #3.

3. Solve for x . Give your answer in interval notation.

$$\left|1 - \frac{3}{x}\right| < 4$$

When we take $1 - \frac{3}{x}$ out of the absolute value, we have two cases:

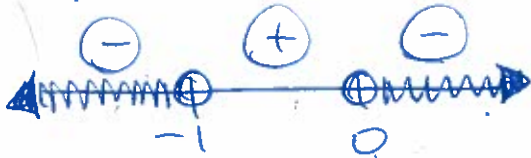
$$1 - \frac{3}{x} < 4$$

$$-3 - \frac{3}{x} < 0$$

$$\frac{-3x-3}{x} < 0$$

$$-3x-3=0 \quad x=0$$

$$x = -1$$



$$-(1 - \frac{3}{x}) < 4$$

$$1 - \frac{3}{x} > -4$$

$$5 - \frac{3}{x} > 0$$

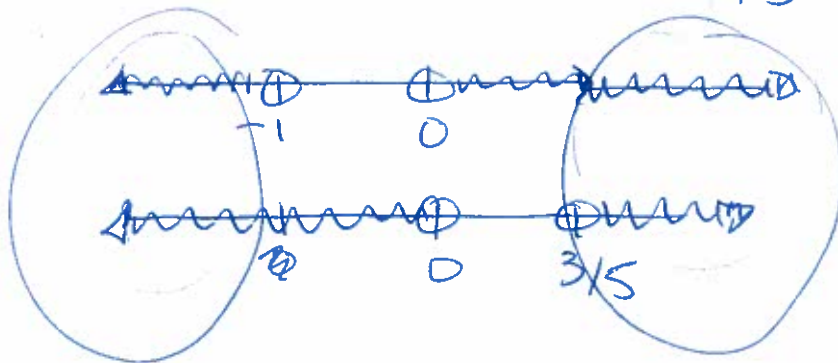
$$\frac{5x-3}{x} > 0$$

$$5x-3=0 \quad x=0$$

$$x = 3/5$$



Intersection
of both
intervals:



$$x \in \underline{(-\infty, -1) \cup (3/5, \infty)}$$