

Please do the problems that you feel will help your group the most first (you don't have to do them in order). All handouts are available at <http://alex.knaust.info/pltlfall2011/>

1. Determine the domain and range of the trigonometric functions, and the (restricted) domain and ranges of their inverse functions.
2. Sketch a graph of  $\sin^{-1}$ ,  $\cos^{-1}$  and  $\tan^{-1}$ .
3. Evaluate the following expressions with inverse functions without the use of a calculator

(a)  $\arctan(-\sqrt{3})$

(b)  $\cos^{-1}(1)$

(c)  $\arcsin\left(-\frac{\sqrt{2}}{2}\right)$

4. Use the properties of inverse functions to find the following values (Sketching a right triangle may help)

(a)  $\sin\left(\arcsin\left(\frac{1}{2}\right)\right)$

(b)  $\sin\left(\arctan\left(\frac{3}{4}\right)\right)$

(c)  $\cot\left(\arctan\left(\frac{5}{8}\right)\right)$

5. Graph  $f(x) = \tan(3x - 2) + 1$
6. Solve for  $x$  in the following equation

$$2 \cos x + 1 = 0$$

7. A periodic function,  $f$ , with period  $t$  has the property that for any  $x$  in the domain of  $f$ .

$$f(x + t) = f(x)$$

- (a) You know that trigonometric functions are periodic, So is  $\sin(x + \pi) = \sin(x - \pi)$  true?
- (b) Can periodic functions have inverses?
- (c) Do periodic functions always have inverses in one cycle of the period?
- (d) Can you think of a periodic function that isn't trigonometric?