

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/>

- Give a triple angle formula for sin, cos and tan (so that you can find i.e. $\sin 3\theta$ if you only know $\sin \theta$)
- Find the exact solutions to the equation in the interval $[0, 2\pi)$
 - $\sin 2x - \sin x = 0$
 - $4 \sin x \cos x = 1$
 - $(\sin(2x) + \cos(2x))^2 = 1$
 - $\frac{1}{2} \sec x - 1 = 0$
 - $\tan^2 u - 6 = 5 \tan u$
- Use the power-reducing formulas to rewrite the following as cos terms of degree one.
 - $\cos^4 x$
 - $\tan^2(2x) \cos^4(2x)$
- Find the following values exactly
 - $\sin\left(\frac{\pi}{4} + \frac{\pi}{3}\right)$
 - $\cos\left(\frac{\pi}{12}\right)$
- Write the following trigonometric expressions as algebraic expressions
 - $\sin(\arcsin x + \arccos x)$
 - $\cos(\arccos x + \arcsin x)$
- Use the sum and difference formulae for sin and cos to show

$$\tan(\alpha \pm \beta) = \frac{\tan \alpha \pm \tan \beta}{1 \mp \tan \alpha \tan \beta}$$

- I'm trying to catch a turkey for my thanksgiving dinner, and have trapped it in a narrow alley. The turkey flies between the two walls at (a fixed height) in a sine wave as follows

$$y = \sin\left(\frac{1}{3}x - \frac{\pi}{4}\right)$$

(Think of the x axis as lying parallel to the alley and the y perpendicular). There are three windows at different distances from the beginning of the alley on the left side (positive y), which one should my sister open if she wants the turkey to fly in?

- $\frac{33\pi}{4}$
- $\frac{5\pi}{4}$
- $\frac{17\pi}{3}$

Happy Thanksgiving!