Problems PreCal 1508 PLTL Workshop, October 14, 2011
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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. Solve the system of linear equations, and check the solutions algebraically

a) $\begin{cases} 2x+4y+z=1 \\ x-2y-3z=2 \\ x+y-z=-1 \end{cases}$ b) $\begin{cases} 5x-3y+2z=3 \\ 2x+4y-z=7 \\ x-11y+4z=3 \\ -x-2y+\frac{1}{2}z=-\frac{7}{2} \end{cases}$ c) $\begin{cases} 2x+y-3z=4 \\ 4x+\quad 2z=10 \\ -2x+3y-13z=-8 \end{cases}$

2. Find the equation of the circle $(0 = x^2 + y^2 + Dx + Ey + F)$ that passes through the points $(0,0), (5,5), (10,0)$.

3. Find values of x that satisfy the following equations

   (a) $\log_6(x+2) - \log_6 x = \log_6(x+5)$
   (b) $\log 4x - \log(12+\sqrt{x}) = 2$
   (c) $\frac{500}{2+e^{2x}} = 20$
   (d) $e^{2x} + 9e^x + 36 = 0$

4. Two cheeseburgers and one small order of French fries contain a total of 830 Calories. Three cheeseburgers and two small orders of French fries contain a total of 1360 calories. Find the Caloric content of each item.

5. Find any solutions of the following system of equations

$$\begin{cases} x^2 - y = 0 \\ 2x + y = 0 \end{cases}$$

6. Are the following true or false? Explain why/give a counterexample

   (a) If two lines do not have exactly one point of intersection, then they must be parallel.
   (b) $2 \cdot \log(x+3) = \log(2x-4) \iff (x+3)^2 = 2x-4$
   (c) The inverse function of $f(x) = x^4 + 2$ is $f^{-1}(x) = \sqrt[4]{x-2}$
   (d) $a < b \Rightarrow \log_b a < 1$
   (e) If a system of equations consists of a parabola and a circle, it can have at most 3 solutions
   (f) $\frac{\log_b x}{\log_b y} = \log_b x - \log_b y$