Math 135: Discrete Mathematics, Spring 2010
Homework 0

Due *in class* on Friday, January 15, 2008

Submit your solutions for this homework *in class* on Friday, January 15. Please make sure to read the course policies on homework *before* writing up your homework.

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1. Simplify the following expressions as much as possible, **without using an calculator (either hardware or software)**. Do not approximate. Express all rational numbers as improper fractions.

   (a) $12/8$ (b) $\dfrac{7}{3} + \dfrac{3}{7}$ (c) $\sqrt{\pi^{1234}}$

   (d) $2^{10000} \bmod 3$ (e) $\frac{\ln 256}{\ln 2}$ (f) $\log_2 8^c$

   (g) $(\log_2 13)(\log_2 5)$ (h) $(x^{x+2} + 2)^2$ (i) $\dfrac{\beta^3 + 1}{\beta^2 - \beta + 1}$

   (j) $\log_2 13 + \log_2 5$ (k) $\displaystyle\sum_{r=1}^{\ell} 2^r$ (l) $\displaystyle\prod_{\ell=1}^{r} 2^{\ell}$

2. Suppose $F(x) = x^2 - 3x + 2$ and $G(y) = y + 10$.

   (a) What is $F(a)$?
   (b) What is $F(G(z))$?
   (c) What is $G(G(G(G(G(10)))))$?
   (d) What is $F(1) * (F(G(\sqrt{\pi})) + G(F(\sqrt{\pi})))$? Do not use a calculator.
   (e) Let $P(x)$ be the sentence "All I want for Christmas is my x front teeth.".
       Write the sentence $P(F(4))$ in colloquial English (no formulas).