Math 135: Discrete Mathematics, Fall 2012
Homework 0

Due in class on Friday, Aug. 31, 2012

Submit your solutions for this homework in class on Friday, August 31. Please make sure to read the course policies on homework before writing up your homework.

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

(a) $\frac{21}{3}$  
(b) $\frac{5}{2} + \frac{2}{5}$  
(c) $\sqrt{\pi^{3456}}$

(d) $2^{32} \mod 3$  
(e) $\frac{\ln 432}{\ln 5}$  
(f) $\log_2 1024$

(g) $\log_2 8^x$  
(h) $(x^2 + 1)(6x + 5)$  
(i) $(x^{x+2} + 2)^2$

(j) $\log_2 6 + \log_2 11$  
(k) $\sum_{r=1}^{103} 2^r$  
(l) $\prod_{\ell=1}^{r} 2^{\ell}$

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

(a) What is $F(a)$?
(b) What is $F(G(z))$?
(c) What is $G(G(G(G(G(10))))))$?
(d) What is $F(1) * (F(G(\sqrt{\pi})))$? Hint: 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).