CS 3510 - Spring 2009
Practice Problems 1

These exercises are for you to practice what you've been learning. Do not hand anything in. Solutions will be posted shortly.

1. Let a, b, and c be positive and real numbers. Show that $a^{\log_b c} = c^{\log_b a}$.
2. Let b be a real number greater than 1, and let x and y be positive real numbers. Show that $\log_b(x^y) = y \log_b x$.
3. Let a and b be real numbers greater than 1, and let x be a positive real number. Show $\log_a x = \log_b x / \log_b a$.
4. Let m be a positive integer. Show that $a \equiv b \pmod{m}$ if $a \pmod{m} = b \pmod{m}$.
5. Let m be a positive integer. Show that if $a \equiv b \pmod{m}$ and $c \equiv d \pmod{m}$ then $a + c \equiv b + d \pmod{m}$ and $ac \equiv bd \pmod{m}$
6. Find $2^{1744} \pmod{127}$. (Hint: notice that 128 is a power of 2.)
7. Find the unit's digit of 287^{3503}.
8. What is $3^{602} \pmod{7}$? (Hint: Use Fermat's little theorem.)