Name:

Math 490, Spring 2013: Homework #4
Due Tuesday, February 19, 2013

1. In this problem you will prove $\cos(\alpha + \beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta$.

a. Use the graphs of $f(x) = \cos x$ and $g(x) = \sin x$ to show $\cos x = \sin(x + \frac{\pi}{2})$ for all real x (you may use GeoGebra or other software, but this is not required).

b. Use the graphs of $f(x) = \cos x$ and $g(x) = \sin x$ to find an identity for $\cos(x + \frac{\pi}{2})$ for all real x (you may use GeoGebra or other software, but this is not required).

c. Use the identities from parts (a) and (b) and the angle sum formula for $\sin x$ to compute $\cos(\alpha + \beta)$. (Hint: Start with $\cos(\alpha + \beta) = \sin(\alpha + \beta + \frac{\pi}{2}) = \sin(\alpha + (\beta + \frac{\pi}{2}))$.

2a. This is a "sequel" to the Hershey's kiss activity done in class on February 14 and inspired by Dan Meyer's "Super Bear" three-act math task. If you want to eat *a lot* of chocolate and it must be in the form of small, medium or large Hershey's kisses, what's the cheapest way to get your fix? Explain your reasoning. The prices (before tax) are:

$8.95 -- 40 oz bag of small Hershey's chocolate kisses (249 candies)
$2.99 -- 1.45 oz "medium" Hershey's chocolate kiss
$3.99 -- 7 oz "large" Hershey's chocolate kiss

b. Suppose you need 2,500 grams of chocolate for a recipe and you have only small, medium and large Hershey's chocolate kisses (you have many of each size). Suppose also that you may only use *whole* medium and large kisses. How many small, medium and large kisses would you need if you want to use the *fewest* possible total number of candies? Explain your reasoning.

c. Give a different answer to part (b) if the condition of using the *fewest* possible total number of candies is removed.

From TEXT:
5.4: 2, 5, 6, 7, 10, 12
5.5: 1, 3, 4, 5, 6