

This assignment is due on **January 18, 2013**.

Goals:

- 1) To practice the art of communicating a written solution to a math problem. You must clearly present the key concepts and the logical sequence of steps taken to arrive at a solution. Just answers are not good enough! Illustrations of solutions by graphing or drawing diagrams are often part of your presentation.
- 2) To encourage the use of the math textbook as a resource for you to learn from and get explanations of concepts and sample solutions.
- 3) To encourage a dialog between students of concepts and processes to achieve solutions to mathematical problems.

Format requirements:

This assignment will be graded so you must show at least one (most of these questions require many more than one) step of work for each question. If I cannot see clearly what you have done I cannot give you the marks. There is only one accepted format for this and all future assignments.

- 1) You will choose **3 of the 5** given questions to complete. (It is still to your advantage, however, to know how all of them are done.) All questions are worth the same number of marks. The questions must be in the same order that they are presented to you. If you do more than 3 questions, only the first 3 will be marked.
- 2) Each step  
for each question  
must be  
on the next line  
down, not to the right.
- 3) Students are encouraged to help each other with understanding the assignments but must submit their own work.
- 4) Any explanations must be done in complete sentences with proper mathematical notation as necessary.

Marks will be deducted if these requirements are not met. Students will be penalized 20% per day when assignments are turned in late and be worth 0 (zero) on the day they are handed back to the students.

Copied assignments will not be marked.

1. Use the double angle identities for sine and cosine to determine half angle identities for sine, cosine and tangent. Use these to determine the exact values of the sine, cosine and tangent ratios of the following angles:

a)  $15^\circ$ .

b)  $\frac{5\pi}{8}$ .

c)  $\frac{13\pi}{12}$

2. Prove:  $-\sin(4x)\sin(6x) = \cos^2(5x) - \cos^2(x)$

3. Three standard dice are tossed.

a) How many possible sums are there?

b) How many ways are there to get a sum of 12?

4. A necklace is made by arranging 3 orange beads and 3 purple beads.

a) How many possible necklaces are there?

b) How many necklaces would there be with 4 orange beads and 4 purple beads?

c) 5 of each?

d) Generalize for N orange and N purple beads.

5. Six students are split into groups. There can be any number of groups (including only one group of all six) or any number of people in a group (including six groups of individuals). How many possible groups are there?