Show work for problems 1, 4, 5, and 6; use the back of the sheet if necessary. Results should, when necessary, be left in the form of unsimplified square roots.

1. **(4 points)** Find all solutions to the equation $4 - 2\sin(3x) = 2$.

2. **(4 points)** Identify each of the following sequences as arithmetic, geometric, or neither. If you identify it as arithmetic or geometric, state its common difference or ratio.

   - $1, 2, 4, 16, 256, \ldots$
   - $\frac{3}{4}, 1, \frac{5}{4}, \frac{3}{2}, \frac{7}{4}, \ldots$
   - $4, -12, 36, -108, 324, \ldots$
   - $3, -1, -5, -9, -13, -17, \ldots$

3. **(3 points)** Give a formula for each of the following sequences, and write the 100th term (you do not need to simplify your expression).

   - $1, 4, 9, 16, 25, \ldots$
   - $\frac{1}{1}, \frac{2}{2}, \frac{3}{4}, \frac{4}{8}, \frac{5}{16}, \frac{6}{32}, \ldots$
   - $2 + \sqrt{1}, 4 + \sqrt{2}, 6 + \sqrt{3}, 8 + \sqrt{4}, 10 + \sqrt{5}, \ldots$

4. **(4 points)** An arithmetic sequence has 50 as its sixth term and 2 as its tenth term. Find the sequence's first term and common difference.

5. **(3 points)** Calculate the partial sum of the arithmetic series $4 + 9 + 14 + 19 + 24 + 29 + 34 + 39 + \cdots + 199$.

6. **(2 points)** Calculate the infinite sum of the geometric series $3 - 2 + \frac{4}{3} - \frac{8}{9} + \frac{16}{27} - \frac{32}{81} + \cdots$

Thursday, April 8, 2010