MTH 110
Quiz 1
Summer 2009

Show all work in a neat and organized fashion. Clearly indicate your answers.
25 points possible.

1. (3 pts.) Identify an apparent pattern in the sequence of numbers. Use this pattern to find the next few numbers.

$$1 \quad 4 \quad 7 \quad 10 \quad \_\_\_\_ \quad \_\_\_\_ \quad \_\_\_\_ \quad \_\_\_\_ \quad 25$$

2. (3 pts.) Identify an apparent pattern in the sequence of numbers. Use this pattern to find the next few numbers.

$$3125 \quad 625 \quad 125 \quad 25 \quad \_\_\_\_ \quad \_\_\_\_ \quad \_\_\_\_ \quad \_\_\_\_ \quad \frac{1}{125}$$

3. (3 pts.) Identify an apparent pattern in the sequence of numbers. Use this pattern to find the next few numbers.

$$2 \quad 5 \quad 10 \quad 17 \quad 26 \quad \_\_\_\_ \quad \_\_\_\_ \quad \_\_\_\_ \quad \_\_\_\_ \quad 101$$

4. (4 pts.) Fill in the blanks with the numbers that complete the sequence. Suggestion: Look at the *third* differences.

$$2 \quad 5 \quad 9 \quad 19 \quad \_\_\_\_ \quad \_\_\_\_ \quad 135$$

5. (4 pts.) Use inductive reasoning to predict the next line in the sequence of computations. Then use a calculator or perform the arithmetic by hand to determine whether your conjecture is correct.

$$\begin{aligned} 1+3 &= 2\times 2 \\ 1+3+5 &= 3\times 3 \\ 1+3+5+7 &= 4\times 4 \\ 1+3+5+7+9 &= 5\times 5 \end{aligned}$$

6. (4 pts.) (a) Choose a number and carry out the procedure described below.
(b) Repeat with a different number of your choice.
(c) Write a conjecture that relates the result of the procedure to the original number selected.
(d) Represent your original number by the variable n and carry out the procedure on n to prove your conjecture.
Procedure: Select a number. Add 6. Multiply by 5. Subtract 10. Divide by 5. Subtract the original selected number.

7. (4 pts.) Expand $(x-y)^5$.

Optional Bonus Problem. Expand $(2w-k)^6$.