Math 141, Spring 2012 _____ Name:_____

Test I, version A (chapters 1 and 2)   100

Show all your work!! Full credit is based on work shown!!   Seat:_____

6pts
1. Fill in the next three numbers for each sequence:

  a. 5, 12, 19, 26, 33, 40,   _____, _____ , _____

  b. 7, 14, 28, 56, 112, _____, _____ , _____

8pts
2. For this sequence from problem 1a: 5, 12, 19, 26, 33, 40, **. . .**
  a. **Describe** this sequence **in a sentence:**

  b. What is the 251st number in the sequence? (Show your work.)

  c. Describe this sequence with a **formula** using n as the variable; that is, what is the formula that would
     generate the sequence if n = 1, then n = 2, etc.?

10pts
3. a. Pick any number and try the following "number magic".
                                        1st try   **2nd try**   **algebraic proof**
Pick any two consecutive numbers
Add them
Multiply by 2
Add 10
Divide by 4
Subtract 2
(Show your result)
  b. What generalization can you make about <u>how the result is related to the original number picked?</u>

  b. Use algebra (in space **above**) to prove that your generalization is correct.
6pts
4. In chapter 1, we studied **strategies** for planning how to solve problems. List six of these strategies.

                                                                            ____
                                                                            30pts

5. **Solve** each of the following problems, **showing your reasoning and calculations**, then **list the problem solving strategies** that you used.

   a. Show **two different methods** for solving this problem:
     Find three consecutive counting numbers whose sum is 171

Method 1: | Method 2:

     List the strategies you used for each method:

b. If fence posts are placed in a row 4 feet apart, how many posts are needed for
    8 feet of fence? _____   12 feet of fence? _____   "n" feet of fence? _____

     List the strategies you used:

14pts
6. If A = {l, a, t, e} and B = {a, e, i, o, u} and the universal set, U = {x | x ∈ the English alphabet} then:

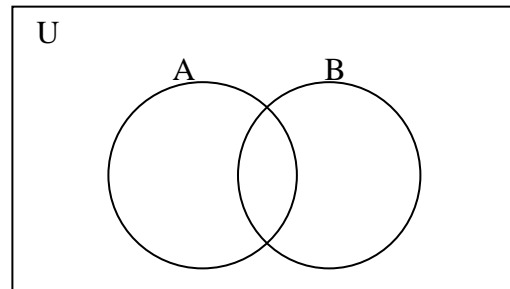 a. A ∩ B = _____   c. List the elements in the appropriate parts of this
                                          Venn Diagram for sets A, B and U:

  b. B − A = _____

  d. The Cartesian Product (A X B)
     has **how many** elements? _____

  e. List **all** the subsets of the set {1, 2, 3}.

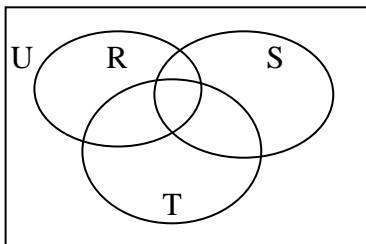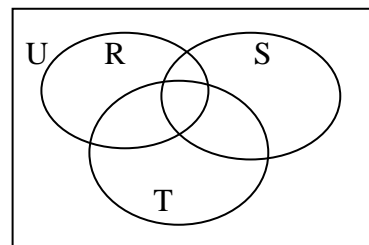4pts
7. Shade each Venn diagram to represent the set indicated:

  a. $(\overline{R \cup T})$ b. $[(\overline{R \cup T}) \cap S]$

                                                                                                        32pts

8. **True or False:** (If false, tell why it is false or correct the statement.)

a. _____ The set {u, n, c, w} is equivalent to the set {w, x, y, z}.

b. _____ $7 \subset \{ 1, 3, 5, 7 \}$

c. _____ If $Y \subset Z$, then $Z \cup Y = Z$

d. _____ $\overline{B} \cap B = \{ \ \}$

6pts

9. Write the usual Hindu-Arabic numeral for each of the following numerals:

a.   b. MDCCXLIV

6pts

10. Write 387 in each of the following number systems.

a. Mayan   b. Babylonian

6pts

11. a. $206_{eight} =$ _____ $_{ten}$ b. $387_{ten} =$ _____ $_{six}$

4pts

12. If you are counting in **base four**, fill in the blanks to show what numerals would follow the ones shown.

1, 2, 3, _____, _____, _____, ... , 32 33, _____, _____, _____, _____, _____, _____, _____ .

8pts

13.a. A particular function is the matching of a whole number with three more than its multiple of 4. This could be expressed with the formula $y = 4n + 3$. If the domain of the function is n ={5, 10, 15}, what is the range of the function? _____ Express this function in each of the following ways:

  b. As a table c. As a set of ordered pairs   d. As a function machine

_____
38pts