Math4010 Midterm 1 Jeopardy Review

Sets/Venn Diagrams

10 points—List all subsets of {m, a, t, h}.

20 points—Let T = the set of trumpet players, S = the set of sophomores, and E = the set of kids who excel in mathematics. Shade in $(T \cup E) - S$ and describe the set in words.

30 points—For the same sets as in the 20 points question, shade in $(T \cup S) \cap E$ and describe that set In words.

40 points—Fill in the Venn Diagram with the following information: In a group of kids, 10 have a cat but not a dog, six children have no animals at all. Three kids own a cat and a dog. Four kids own only a bird. Two kids have all three pets. Six children have a bird, but not a dog, and five have a dog and a bird. Twelve children have a dog.

50 points—For the Venn Diagram from the 40-points problem, how many kids are in each of these sets?

(a) $D \cap C \cup B$
(b) $D \cup C - (D \cap B)$
(c) $\overline{B} \cup \overline{C}$
(d) $(B \cap C) - D$

Number Systems

10 points—Write 34 with the Tally System.

20 points—How many symbols/numerals are needed for a base 15 number system?

30 points—Write 31419 with the Roman Numeral System.

40 points—Write 513 using the Mayan Number System.

50 points—Convert 281 to base 5.

60 points—Convert 3167 to base 8.

70 points—Convert 111 to base 2.

80 points—Convert 10211102 base 3 to a base 10 number.

90 points—Convert 43501_6 to base 10.

Problem-solving

10 points—If a fence requires a post every 5 feet, how many posts are required for a fence that encloses a 90 ft. by 50 ft. area of land?

20 points—In three years, Mary will be three times my present age. I will then be half as old as she. How old am I now?

30 points—A letter was posted that was covered with 10-cent and 5-cent stamps. There were 12 stamps altogether, and the total postage was 70 cents. How many of each stamp were on the letter?

40 points—A certain type of tubing comes in lengths of 6-ft, 8-ft, and 10-ft sections. How many different lengths can be formed using four sections of tubing?

50 points—Two friends are shopping together when they encounter a special "3 for 2" shoe sale. If they purchase two pairs of shoes at the regular price, a third pair (of lower or equal value) will be free. Neither friend wants three pairs of shoes, but Pat would like to buy a $56 and a $39 pair of shoes while Barbara is interested in a $45 pair of shoes. If they buy the shoes together to take advantage of the sale, what is the fairest share for each to pay?

60 points—There are six baseball teams in a tournament. The teams are lettered A through F. Each team plays each of the other teams twice. How many games are played altogether?

Arithmetic

For each problem, use two different methods to show each of the computations.

10 points-- $145_7 \cdot 63_7$

20 points-- $1001111_2 + 111001_2$

30 points-- $735_8 \div 6_8$ (Use one partitive and one measurement model.)

40 points-- $201_3 - 122_3$

50 points-- $331_4 + 230_4$

60 points-- $441_5 \cdot 4_5$

70 points-- $532_6 \div 41_6$ (Use one partitive and one measurement model.)

80 points-- $2345_9 - 1867_9$

Properties

10 points-- Rewrite these expressions as a single exponent expression.
(a) $7^{12} \cdot 2^{12} \cdot 14^5$
(b) $4^5 \div 2^8$

20 points-- Identify the property of whole numbers being used in these examples.
(a) $(3+2)\cdot 1 = 3+2$
(b) $(4+7)+8 = 4+(7+8)$
(c) $(a-b)c = ac-bc$
(d) $(5\cdot 3)7 = (3\cdot 5)7$

30 points--Are whole numbers closed under addition? Subtraction? Multiplication? Division?

40 points—Using the following table that defines the operator * on the set {X, Y, z}, answer the questions.

*	X	Y	Z
X	Y	Y	X
Y	A	Z	Y
Z	X	Y	Z

(a) Is the set closed under the operator *?
(b) Is there an identity element? If so, what is it?
(c) Is the operator commutative?
(d) Find Y*Z.

50 points-- If each different letter represents a different digit, find the number "HE" such that $(HE)^2 = SHE$.

Hodge Podge

10 points-- Do these computations, or explain why they cannot be done.
(a) $0 \div 5$
(b) $3 \div 0$
(c) $0 \div 0$

20 points-- Calculate the following problems mentally (but write down your steps).
(a) 17 x 99
(b) 17 (6) – (6) 7
(c) 81 – 39

30 points-- (True or False? Explain your answer) Subtraction of whole numbers is commutative.

40 points-- Explain the difference between the wording “divided by,” “divided into,” and “divides.”

50 points--(True or False? Explain your answer) $(3^4)^2 = 3^{(4^2)}$

60 points--(True or False? Explain your answer) There is only one right way for students to perform all the arithmetic operations, namely the standard algorithm.