### DO NOT TURN THIS PAGE UNTIL YOU ARE INSTRUCTED TO DO SO

- ❖ Write your name below on the space provided.
- ❖ This test has a total of $11_{four}$ pages.
- ❖ Work the problem in the space provided. If you need more space, write on the back of the test.
- ❖ To insure maximum credit, show your work. In general, full credit will not be given for unsupported answers.
- ❖ Look only at your test. Don't give me the impression that you are cheating.
- ❖ Be sure to write neatly. If I cannot read what was written, do not expect the problem to be graded.
- ❖ If you finish early, go over the test again.

### Good luck!

| Number | Maximum | Score |
|--------|---------|-------|
| 1 | 3 | |
| 2 | 3 | |
| 3 | 15 | |
| 4 | 3 | |
| 5 | 6 | |
| 6 | 12 | |
| 7 | 6 | |
| 8 | 12 | |
| 9 | 12 | |
| 10 | 5 | |
| 11 | 5 | |
| 12 | 3 | |
| 13 | 8 | |
| 14 | 4 | |
| 15 | 3 | |
| Total | 100 | |

Name _____

# Circle Final Answers

1) (3 points) Write the first 10 counting numbers (starting with 1) in base 4. You do not have to write the subscript:

2) (3 points) Count from $63_{seven}$ to $101_{seven}$. You do not have to write the subscript:

3) (4 points $a$, $b$; 7 points $c$) Convert the following numbers to the given base:
a) $5322_{eight}$ to base 10                    b) 2,001 to base 7

c) $11110010_{two}$ to base 16

4) (3 points) List the first 10 prime numbers starting with 2:

5) (3 points each) Write the prime factorization for the following numbers:
a) 228                    b) 1075

6) (3 points each)  Label the following as either true or false.  Use the word "true" or "false" to mark your answer.  If false, explain why or give a counter-example:

a)  $16\,|\,4$                                                      b)  $4\,|\,16$

c)  If 3 divides into a number and 4 divides into the same number, then 12 also divides into that number.

d)  If 2 divides into a number and 4 divides into the same number, then 8 also divides into that number.

7) (3 points)  What is the divisibility test for…

a)  4?                                                              b)  5?

8) (4 points each)  Label the following numbers as perfect, abundant, or deficient.  Be sure to show supportive work:

a)  6                            b)  17                            c)  24

9) (3 points each)  A Goldbach number is a positive integer that is the sum of two odd prime numbers.  The following numbers are Goldbach numbers.  Determine two odd primes that add up to them:

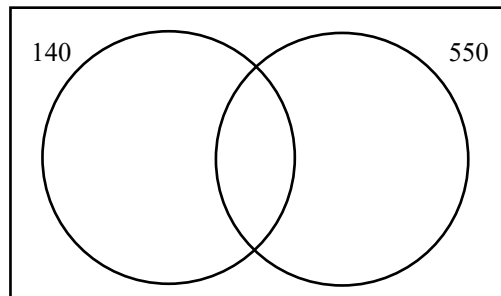a)  36                                                             b)  50

c)  Why must a Goldbach number be an even number?

d)  Why isn't 2 a Goldbach number where $1 + 1 = 2$?

10) (5 points) Sally ordered McChickens from McRutrohs®. She had a total of 96 McChickens total from ordering some 6-packs, 9-packs, and 20-packs. (That is, at least one pack of each was ordered). Determine how many of each pack she ordered.

11) (5 points) For the numbers 140 and 550, find the GCF and the LCM using your favorite method. Be sure to label your answers:

12) (3 points) Using your work above, fill in the Venn Diagram for the numbers 140 and 550. The numbers in the 140 circle should multiply to 140. The numbers in the 550 circle should multiply to 550.



13) (4 points) Border guards are checking cars as they pass into Mathland, the happiest place on Earth. Border Guard Bell checks every $14^{th}$ car, Border Guard Biv checks every $10^{th}$ car, and Border Guard DeVoe checks every $4^{th}$ car. What will be the first car checked by…

a) Bell and DeVoe?                              b) All three?

14) (4 points) Write the first 10 terms of the Fibonacci Sequence:

15) (3 points) List two things you learned about the Golden Ratio while watching *Donald Duck in Mathmagic Land*.

16) Extra Credit (1 point each):  Match the event on the left with the item on the right:

_____ Built the first ruler                                         A.  India

_____ Did not use numbers in their language                   B.  Archimedes

_____ Invented the binary calculator to try to eliminate human error      C.  Warlpiri Tribe

_____ The reason that Roman Numerals were no longer used as the universal number system      D.  Fibonacci

_____ Credited with inventing the number zero                   E.  Pythagoras

_____ Credited with bringing Hindu-Arabic numbers to the West      F.  Capitalism

_____ Developed the mathematics necessary to turn a sphere into cylinder which helped modern mapmakers      G.  Egyptian

_____ The world's first writing                                H.  Leibnitz

_____ Did not allow his followers to eat beans/Discovered that harmonies in music are combinations of whole numbers      I.  Numbers