First name: _____ Last name: _____   Student ID: _____

Number Theory Homework

Basic problems:

1. Classify each number as prime or composite.

1. **367** ☐Prime ☐Composite	2. **128** ☐Prime ☐Composite	3. **226** ☐Prime ☐Composite	4. **824** ☐Prime ☐Composite
5. **49** ☐Prime ☐Composite	6. **111** ☐Prime ☐Composite	7. **248** ☐Prime ☐Composite	8. **127** ☐Prime ☐Composite

2. Use the Distributive Property to find each product.

1. $(7\,0 \times 40) + (70 \times 3)$	2. $(98 \times 40) + (98 \times 7)$	3. $(28 \times 60) + (28 \times 1)$
4. $(248 \times 20) + (248 \times 8)$	5. $(563 \times 60) + (563 \times 0)$	6. $(352 \times 40) + (352 \times 4)$

3. Find the least common multiple.

1. 16, 150, and 160	2. 30, 150, and 180	3. 69, 120, and 369
4. 70, 110, and 140	5. 20, 128, and 140	6. 515, 625, and 140

4. Find the greatest common factor of each set of numbers.

1. 164, 160, and 720	2. 350, 955, and 605	3 987, 630, and 70
4. 920, 444, and 824	5. 482, 340, and 788	6. 345, 965, and 765

Challenge problems

1. The volume of a cereal box is 1925 cm^3. What are the different possible integral dimensions of the cereal box?

2. The eight digit number 1234□678 is divisible by 11. What is the digit □?

3. The four digit number 43□□ is divisible by 3, 4 and 5. What are the last two digits?

4. (a) If a number is divisible by 2 and 3, is it always divisible by 6?

(b) If a number is divisible by 2 and 4, is it always divisible by 8?

5. What is the smallest positive integer that you must multiply 48 by so that the product is divisible by 45?

6. The product of three different positive integers is 144. What is the maximum possible sum of these three integers?

7. The digits 1; 2; 3; 4; 5 and 6 are each used once to compose a six digit number abcdef, such that the three digit number abc is divisible by 4, bcd is divisible by 5, cde is divisible by 3 and def is divisible by 11. Determine all possible assignments of the digits to the letters.

8. What is the smallest positive integer that you must multiply 1512 by in order to get a perfect square?

9. If x and y are two-digit positive integers with xy = 555, what is x + y?

10. Sam was buying hot dogs and hot dog buns for a backyard barbeque. Hot Dogs come in packs of 16, but buns come in packs of 12. What is the minimum number of packs of each will Sam have to buy so that there are no hot dogs or buns left over?

11. A florist has 72 roses, 84 tulips and 48 orchids that she wants to use to create bouquets. What is the largest number of identical bouquets she can put together without having any flowers left over?

12. Let S be the number of perfect squares among the integers from 1 to 2013^6. Let Q be the number of perfect cubes among the same integers. What is the relationship between S and Q?

13. Vince has three pieces of rope with lengths of 300 cm, 312 cm and 396 cm. He wants to cut the three pieces of rope into smaller pieces of equal length with none left over.
(a) What is the greatest possible length of each of the smaller pieces of rope?
(b) How many of the smaller pieces of rope will he have altogether?

14. Two flashing signs are turned on at the same time. One sign flashes every 4 seconds and the other flashes every 6 seconds. How many times will they flash at the same time in 1 minute?