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

# Chapter 1 Number Theory (3) Homework

## Basic problems

1. Find the GCF and LCM for the following sets of numbers.

1) 20 and 8

2) 12 and 42

3) 8 and 12

4) 12 and 21

5) 30 and 65

6) 10 and 12

7) 20 and 36

8) 15, 20, 30

9) 6, 8, 12

10) 30, 45, 60

11) 12, 18, 20, 32

12) 17, 68, 34

13) 10, 105, 22

14) 25, 75, 200

15) 168, 210

2. Recall that two numbers are relatively prime if their GCF is 1. Determine whether each pair of numbers is relatively prime. If not, please indicate the GCF.

1) 70, 75 2) 32, 84 3) 35, 72

4) 49, 93 5) 81, 192 6) 245, 246

**Word problems**

1. An interesting result from number theory is the following theorem: **If A and B are two whole numbers, the product of their LCM and GCF is equal to their product AB.** Answer the following questions (based on the theorem stated above).

a) If two numbers are relatively prime, what does this theorem tell us about their LCM?

b) If the product of two numbers is equal to their LCM, what does this theorem tell us about the two numbers?

c) Suppose the product of two numbers is 150 and their GCF is 5. What is the LCM of the two numbers?

d) Suppose the product of two numbers is 144 and their GCF is 4. What is the LCM of the two numbers?

e) Suppose the product of two numbers is 200 and their LCM is 40. What is the GCF of the two numbers?

f) Suppose the product of two numbers is 160 and their LCM is 20. What is the GCF of the two numbers?

g) True or False: The GCF of two numbers is a factor of their LCM. Explain why/why not.

h) True or False: The LCM of two numbers is a factor of their GCF. Explain why/why not

2. John and Tracy are moving to a new house, and have a lot of books to move. John can carry 6 books at a time, while Tracy can carry 4. John wants to make 10 trips, then stop. How many trips will Tracy need to make to have carried the same number of books?

3. Henry and Margo both began traveling around a circular track. Henry is riding his bike, and Margo is walking. It takes Henry 7 minutes to make it all the way around, and Margo takes 12 minutes. How much time will pass until they meet at the starting line?

4. The Carmack and Regal cinemas start movies at 7:15 p.m. The movie showing at the Carmack lasts 2 hours and the movie at the Regal lasts one hour and 45 minutes. If the movies run continuously, when will the movies start at the same time again?

5. Martin is pasting pieces of square colored paper of equal size onto a board measuring 72 cm by 90 cm. If only whole square pieces are used, and the board is to be completely covered, find the largest possible length of the side of each square colored paper.

**Challenge Problem:** Find the greatest common factor and least common multiple for each set of expressions.

1) $45x^2y^5$, $15x^3y^3$ 2) $30x^3y^7$, $15x^6y^4$ 3) $8a^7b^6$, $6a^5b^2$ 4) $12a^6b^5$, $18a^4b^3$