Math4010 Midterm 2 Review

GCF/LCM
For each problem, use two different methods to find both the GCF and LCM of the given numbers. (You can leave answers in factored form, if you'd like.)

G1. 36, 1470

G2. 462, 180

G3. 225, 154

G4. 270, 210, 630

G5. 45, 60, 66

Number Theory

N1. Use divisibility tests to find the prime factorization of the following numbers.
   (a) 1960
   (b) 2772

N2. Is the prime factorization of any whole number unique? Why or why not?

N3. Is it possible for the sum of two odd prime numbers to be a prime number? Why or why not?

N4. How many factors does the number $2^3 \cdot 3 \cdot 7 \cdot 11^2$ have?

N5. Suppose a student said that the sum of the digits of the number 354 is 12 and therefore 354 is divisible by any number that divides into 12, like 2, 3, 4 and 6. Would you agree with the student? Explain.

N6. When Joe sorts his marbles, he notices that if he puts them into groups of 5, he has 1 left over. When he puts them into groups of 7, he also has 1 left over, but in groups of size 6, he has none left over. What is the smallest number of marbles that he could have?

N7. Three neighborhood dogs barked consistently last night. Spot, Patches, and Lady began with a simultaneous bark at 11 p.m. Then, Spot barked every 4 minutes, Patches every 3 minutes and Lady every 5 minutes. When did Mr. Jones suddenly awaken from the loud sound of all three dogs barking together?

Integers

I1. Compute $-|-4| - 6^2 + (-1)^{41}(56) \div 7 \cdot 3 + (-3)^4$

For I2-I5: Model the computation in two different ways.

I2. -(-4) – 5

I3. $-12 \div 4$

I4. 6(-3)

I5. 8 + -13

I6. Show how you would do this computation on a number line.
$$-(-2) - (-5) + 6$$

I7. Evaluate these numerical expressions.
      (a) $(-2)^4$
      (b) -2^4
      (c) $(-2)^{-4}$
      (d) $(-2)^0$
      (e) -2^0

True/False
For each problem, determine if the statement is true or false. If it's false, explain why.

T1. $2^3 \cdot 3^4 \cdot 5$ has 12 total factors.

T2. Every prime number is odd.

T3. The number 12 is a multiple of 36.

T4. Exponents distribute through division.

T5. 1 is the smallest prime number.

T6. If $a \neq b$, then $GCF(a, b) < LCM(a, b)$.

T7. The set of fractions contains multiplicative inverses.

T8. $\dfrac{39}{2^2 \cdot 13 \cdot 5^3}$ is a terminating decimal.

T9. There is a fraction greater than $\dfrac{2}{3}$ and less than $\dfrac{1}{3}$

T10. All decimals can be written as fractions.

T11. 1 : 7 = 3.2 : 22.4 is a valid proportion.

T12. $\dfrac{2}{7} \div \dfrac{3}{4} = \dfrac{7}{2} \cdot \dfrac{3}{4}$

Fractions, Decimals and Percentages

For F1-F3: Draw a picture to clearly illustrate your calculation and answer to each of the following questions.

F1. Which is bigger: $\dfrac{7}{9}$ or $\dfrac{4}{5}$?

F2. Find $\dfrac{5}{6}-\dfrac{3}{5}$.

F3. Find $\dfrac{2}{5}$ of $\dfrac{3}{7}$

For F4-F6: Create a word problem that requires the give calculation and the answer that is provided.

F4. $11\div3=3\dfrac{2}{3}$

F5. $23\div5=5$

F6. $\dfrac{5}{8}\div\dfrac{1}{3}=1\dfrac{7}{8}$

F7. Simplify the following expressions.

    (a) $\dfrac{2}{\frac{1}{3}+\frac{1}{5}}-4\div\dfrac{32}{3}$

    (b) $(58.83-57.58)16.9\div(0.5)^3$

F8. Order these numbers and plot them (as points) on a number line. Identify each point by placing the corresponding letter above the point.

$A=\dfrac{3}{4}$ $B=\dfrac{0}{8}$ $C=0.5$ $D=0.5555...$ $E=0.6$ $F=\dfrac{2}{9}$

$G=0.\bar{9}$ $H=\dfrac{2}{3}$ $I=0.9$ $J=\dfrac{1}{8}$

F9. Convert 3.1255555.... to a fraction.

F10. Convert $\dfrac{4}{9}$ to a decimal.

F11. Convert 0.008125 to a fraction (in simplest form).

F12. A dress was sold with a 30% discount. The sale price of the dress was $42. What was the original price of the dress?

F13. One fifth of the world's population loves ice cream and three sixteenth of the rest love cotton candy. What percent of the world's population loves cotton candy?

F14.   A recipe calls for $3\frac{2}{5}$ cups of flour. You find that you only have $1\frac{1}{2}$ cups of flour left in your cupboard. What <u>fraction of the recipe</u> can you make? (Assume that you don't run next door to borrow more flour from your neighbor.)

F15.   Gideon spends $\frac{1}{6}$ of his monthly budget on his car, $\frac{3}{8}$ of his budget on housing, $\frac{1}{4}$ of his budget on entertainment, and the remaining $250 on groceries. What is the total amount of his monthly budget?

F16.   A family uses 13 loaves of bread every 6 weeks. At that rate, how many loaves of bread will they need to purchase in a year's time?

F17.   I purchased a radio for $84. That was 20% off the original price. What was the original price and how much did I save?