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Mathematics for Elementary School Teachers
Exam III
April 28, 2000

The point value of each problem is given in the margin.

(12) 1.(a) Use the Euclidean Algorithm to find $\text{GCD}(552, 270)$.

(b) Find $\text{LCM}(2^2 \cdot 5 \cdot 7^2, 2 \cdot 3^3 \cdot 5^2 \cdot 7 \cdot 11^2)$.

(c) Suppose $\text{GCD}(a, b) = 1$. Find $\text{LCM}(a, b)$ in terms of a and b.

(12) 2. Circle **T** for true and **F** for false.

T F (a) Let m/n be a reduced proper fraction, such that $5 \nmid n$ and $2 \nmid n$. Then m/n has a periodic decimal expansion.

T F (b) Let m/n have a terminating decimal expansion of length 2. If m/n is a reduced proper fraction then $n = 2^2 \cdot 5^2$ or $n = 2 \cdot 5$.

T F (c) If m/n is a reduced proper function with delay 2 and period 6, then m/n is equal to a fraction with denominator $99,999,900$.

(12) 3.(a) If July 4 is on a Tuesday, on what day of the week does it fall the following year if we assume the following year is a leap year (366 days)?

(b) The Romans once used an 8-day week. Assuming April still had 30 days, but was based on an 8-day week, if the first of April fell on Sunday, and the extra day after Saturday was called Venaday, on what day would the last day of the month fall?

(12) 4. Determine:

(a) $1,173,214,982 \mod 10$.

(b) The remainder for $10^{101} \div 11$.

(10) 5.(a) Convert the decimals $.0\overline{2}$ and $.\overline{14}$ into fractions.

(b) Convert the fractions $1\frac{3}{7}$ and $\frac{3}{5}$ into decimals.

(8) 6. Compute:

(a) $\dfrac{3}{16} - \dfrac{7}{8}$

(b) $\dfrac{5}{6} + 2\dfrac{1}{8}$

(12) 7.(a) Five eights of the students at Salem State College live in dormitories. If 6,000 students at the college live in dormitories, how many students are there in college?

(b) A suit is on sale for \$180. What is the original price of the suit if the discount was $\frac{1}{4}$ the original price?

(10) 8.(a) Arrange each of the following fractions in decreasing order:

$$\frac{11}{22}, \qquad \frac{11}{16}, \qquad \frac{11}{13}$$

(b) Find a rational number between $\frac{3}{7}$ and $\frac{4}{7}$.

(12) 9.(a) If m/q_1 is a reduced fraction with a decimal expansion period of 81 and m/q_2 is a reduced fraction with a decimal expansion period of 21, and q_1 and q_2 are distinct primes, find the decimal expansion period of m/q_1q_2.

(b) Let m/n be a reduced fraction whose decimal expansion has period 1. Find all possible denominators n.

(c) Let m/n be a reduced fraction whose decimal expansion has period 1. Using (b) list all such fractions.