1. [9 pts - 3 each] Circle the larger Roman numeral in each pair:

$$CDXLIII = 443$$

2. [6] pts/Create the smallest possible Roman numeral from these digits: $(\mathcal{L}, \mathcal{D}, \mathcal{D}, I, \mathcal{M}, \chi, X)$



MCDXCIX

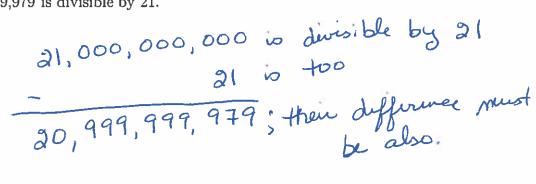
3. (a) [8 pts] Find all values of the digit d in the number 152d2 that make this number divisible by 4. Briefly explain your reasoning in a sentence.

(b) [5 pts] Demonstrate the test for divisibility by 11 on the number 31526. State your conclusion.

4. [8 pts] Use the definition of divides to decide whether this statement is true or false: "30 divides 15." Show clear work and thorough explanation.

-2 bred W -2 bred W -2 br. 15 30 -2 br. 5 30

5. [6 pts] Show work in using the Divisibility-of-a-Sum Theorem to determine whether 20,999,999,979 is divisible by 21.



- 3 3 mly
- 6. [5 pts] In a 1-600 Sieve of Eratosthenes, what is the largest number that will produce any "crossing out"?

√600 €

7. [8 pts] True or false: If a number is divisible by 12 and 15, then it must be divisible by 12 + 15. Justify your answer.

Molbers 3"3"

8. (a) [8 pts] How many different factors does the number $3^5 \cdot 5^2 \cdot 11^4 \cdot 17^9$ have in all?

(b) [12 pts] Find four of them that are between 30 and 200.

$$5^2 \cdot 3 = 75$$
 $11^2 = 121$
etc.

23.53.72 22.3.72

GCD = 4.

17.3 = 51

17.9 = 153

11² = 121

45

17.5 = 85

9. [8 pts] Use any technique to find the LCM (only!) of the numbers $10^3 \cdot 7^2$ and $14^2 \cdot 3$.

$$\frac{4800.32 = a.960}{960}$$