Math 9 Enriched

1.5 Divisibility

Name _____ Date _____

1. Which number is *not* divisible by 3?

   582, 441, or 782

2. How many of the first 50 counting numbers are divisible by both 2 and 3?

3. What value can a have to make $\underline{a74a}$ divisible by 36?

4. If the three-digit number $\underline{56u}$ is divisible by 6, what is u?

5. What digit can replace k in the number $\underline{9k73k0}$ so that the number will be divisible by 60?

6. What is the largest three-digit number divisible by 3, 4, 5, and 6?

7. $\underline{abab}$ is a four-digit number with $a \neq 0$. What is the largest prime number by which $\underline{abab}$ must be divisible?

8. What percent of the odd numbers between 0 and 100 are multiples of 3?

9. If the three-digit number $\underline{2d2}$ is divisible by 7, what is d?

10. The five-digit number $\underline{6a47b}$ is divisible by 18. What is the smallest possible value of $a - b$?

11. Find distinct digits A and B such that $\underline{A47B}$ is as large as possible and divisible by 36. Name the number.

12. Arrange the four digits 1, 2, 3 and 7 so that the four-digit number you get is a multiple of 8.

13. Find the smallest value of $a + b$ for which the sum $\underline{4a5} + \underline{3b7}$ is a multiple of 9.

14. Find the least possible value of digit d so that $\underline{437{,}d03}$ is divisible by 9.

15. For what digit a in the hundreds position will the six-digit number 907 a32 be divisible by 33?

16. How many positive integers less than 400 are divisible by both 7 and 11?

17. For what digit n is the five-digit number $3n85n$ divisible by 6?

18. The six-digit number $3730n5$, with tens digit n, is divisible by 21. What is the value of the digit n?

19. For what value of n is the five-digit number $7n{,}933$ divisible by 33?

20. Challenge: Find a nine digit number that is divisible by all the integers from 1 to 9

21. The digits 1,2,3,4, and 5 are used to make a five digit number PQRST. The three digit number PQR is divisible by 4, the three digit number QRS is divisbile by 5, and the three digit number RST is divisible by 3. What is P?

22. When the three-digit number 5a2 is added to the number 247, the resulting number is a three-digit number 8b9. Find a + b if 8b9 is divisible by 9.

23. Let N = 2 4 36 510 7 9 .

    a) How many factors does N have?

    b) How many odd factors does N have?

    c) How many even factors does N have?

    d) How many perfect square factors does N have?

    e) How many odd perfect square factors does N have?

    f) How many even perfect square factors does N have?

    g) How many factors of N are multiples of 7?

    h) How many factors of N are not multiples of 7?

24. CHallenge: Call a number prime-looking if it is composite but not divisible by $2, 3$, or 5. The three smallest prime-looking numbers are $49, 77$, and 91. There are 168 prime numbers less than 1000. How many prime-looking numbers are there less than 1000? AMC12