

Name _____

No calculators allowed!

1. (4 points) Find whole number values for a and b so that

$$3^{200} \cdot 5^{200} \cdot 15^{300} = a^b$$

2. (4 points) Evaluate the following product using base 5 as indicated.

$$32_{five} \cdot 4_{five}$$

3. (4 points) Find the prime factorization of 135.

4. (4 point each) Circle **T** for true or **F** for false for each of following statements. No explanation is necessary.

(a) **T** or **F**: $15|35$

(b) **T** or **F**: 96390003600013 is a multiple of 3

(c) **T** or **F**: 1 is a prime number

(d) **T** or **F**: 91 is a prime number

(e) **T** or **F**: 97 is a prime number

(f) **T** or **F**: $\frac{81}{2^7 \cdot 3^2 \cdot 5^8}$ can be represented by a terminating decimal

5. (4 points each) Use any method to evaluate the following. For parts (c) and (d) you do not need to simplify your answer.

(a) $GCD(45, 30)$

(b) $LCM(45, 30)$

(c) $GCD(2016, 548800)$

Hint: $2016 = 2^5 \cdot 3^2 \cdot 7$ and $548800 = 2^6 \cdot 5^2 \cdot 7^3$

(d) $LCM(2016, 548800)$

6. (4 points) Midas has 120 gold coins and 96 silver coins. He wants to place his gold coins and his silver coins in stacks so that there are the same number of coins in each stack. What is the greatest number of coins that he can place in each stack?

7. (3 points each) Fill in the blanks with correct answers chosen from the set $\{0, 1, 2, 3, 4, 5, 6, 7, 8\}$.

(a) $23 \equiv \underline{\hspace{2cm}} \pmod{9}$

(b) $999992 \equiv \underline{\hspace{2cm}} \pmod{9}$

(c) $-14 \equiv \underline{\hspace{2cm}} \pmod{9}$

8. (4 points) Find four values of x (two positive and two negative) such that $x \equiv 3 \pmod{5}$

9. (3 points each) Fill in the blanks by performing the following operations on an 6-hr clock.

(a) $5 \oplus 3 =$ _____

(b) $2 \ominus 4 =$ _____

10. (4 points) Write the fraction $\frac{350}{550}$ in simplified form.

11. (4 points) A survey was taken to determine whether children preferred vanilla, chocolate, or strawberry ice cream. One half of those surveyed preferred chocolate. One third of those surveyed preferred strawberry. What fraction of those surveyed preferred vanilla?

12. (4 points) As of today, Cathy has read one-third of a certain book. If she still has 800 pages left to read, then what is the total number of pages in the book?

13. (4 points) A plot of land has an area of 1800 square feet. Use the fact that there are 3 feet in each yard to convert this area to square yards.

14. (4 points) Rewrite the number 0.00057 using scientific notation.

15. (4 points) Convert the following repeating decimal to a simplified fraction.

$$0.\overline{15} = 0.15151515\dots$$

16. (4 points) Find the decimal representation for $\frac{5}{6}$. If it is a repeating decimal, be sure to clearly show which digits repeat.

17. (4 points) In one year the enrollment at N. K. Barrett High School dropped from 500 students to 400 students. What percentage decrease does this represent?