

Exam 2
MTH T101 Fall 2003

Name _____

1. (4 pts) Define *equation*.

2. (4 pts) True or false:

(a) If p and q are prime numbers, then $p + q$ is even. _____

(b) Teaching “whole number \div fraction” is easier and therefore taught before “fraction \div whole number.” _____

3. (4 pts) Fill in the blank:

(a) The _____ property is the most important property in proving the rule:
 $(a + b)(c + d) = ac + bc + ad + bd$.

(b) What operation for whole numbers needs to be reinterpreted to make sense of it for fractions?

4. (6 pts) Circle the numbers below that divide the number 243, 276.

3

4

5

8

9

11

5. (6 pts) What is the largest prime less than 236? (Show your reasoning.)

6. (7 pts) Determine how many zeros are at the end of the decimal form of $55!$.

7. (8 pts) Use mental math to compute the following. Write down your answer in a way that clearly shows the steps involved in solving the problem mentally.

a. 16×18

b. 64×32

c. $\frac{3}{16} - \frac{3}{8} + \frac{7}{16}$

d. 51^2

8. (7 pts) Simplify as much as possible. Write out *every* step neatly – this will reduce errors.

$$\frac{15^2 \cdot 4^5 \cdot 5^0}{12^2 \cdot 25}$$

9. (7 pts) Explain why $6^4 \cdot 6^5 = 6^9$ is true using the appropriate definition and arithmetic properties.

10. ($7 + 7 = 14$ pts) Give a teacher's solution using the method specified:

(a) (*using a diagram*) $\frac{3}{8}$ of a group of children are girls. There are 30 more boys than girls. How many children are there altogether?

(b) (*using algebra*) Aminah used $\frac{1}{3}$ of the flour to bake some cakes and $\frac{1}{6}$ of the remainder to bake some cookies. If she has 10 kg of flour left, how much did she start out with?

11. (6 pts) Illustrate how to multiply $\frac{4}{5} \times \frac{2}{3}$ using an area model.

12. ($2 + 6 + 4 = 12$ pts) Answer these questions about $\frac{4}{9} \div \frac{3}{5}$:

(a) Write the interpretive question which corresponds to partitive division for $\frac{4}{9} \div \frac{3}{5}$.

(b) Draw the bar diagram which corresponds to partitive division for $\frac{4}{9} \div \frac{3}{5}$ and find the solution by using the diagram.

(c) Show how the diagram and logic in part (b) lead to the “invert and multiply” rule.

13. (7 pts) Give an algebraic proof of the following: A number n is divisible by 4 if and only if its last two digits are divisible by 4.

14. (8 pts) Prove that there are an infinite number of primes.