Test 2
T101 Spring 2014
Enrique Areyan

Name:_____

   In all problems you must **show your work** to receive credit (except for short answer problems). No books, notes, calculators, computers, or cellphones are allowed. Please try to fit your answer in the space provided, and do not use any additional paper of your own. If you need more space you can continue on the back of the same page; please indicate clearly that your answer is continued on the back.

Question	Points	Question	Points	Question	Points
1	/12	2	/12	3	/12
4	/12	5	/12	6	/12
7	/16	8	/16	9	/12

1. (12 points) Indicate whether each number is prime or composite or neither by writing P or C or N in the blank next to the problem. If it is composite, write down one of the factors that is not one or the number itself.

   a) $8! + 7$ _____

   b) 1234 _____

   c) $906,633$ _____

   d) 1 _____

2. (12 points) Indicate whether each of the items below is an Algebraic Expression (AE), Equation (EQ) or Invalid (IN)?

   a) $10a \div 0$ _____

   b) $0 \div 10a$ _____

   c) $\dfrac{(a+b) - c}{a+1}$ _____

   d) $ab + ac = a(b+c)$ _____

3. (12 points) Give an algebraic Teacher's Solution using one variable: Peter has twice as many stickers as Joe. Joe has 40 more stickers than Emily. They have 300 stickers altogether. How many stickers does Peter have?

4. (a) (6 points) Complete the identities below.

$(a + b)^2 = $ _____

$(a - b)^2 = $ _____

$(a + b)(a - b) = $ _____

(b) (6 points) Use mental math and the identities in part (a) to find the following. For each item, you must choose the identity that makes the problem as simple as possible. Show the steps that you are using in your mental math.

(i) (3 points) $(41)^2$

(ii) (3 points) $(101)(99)$

5. (12 points) Let m and n be two whole numbers. Simplify the expression below as much as possible, factoring the numbers and leaving the answer in exponential form with all prime bases.

$$\frac{8^{3n} \cdot (50)^{3m+2n}}{(15)^{2m} \cdot 4^{3n} \cdot (9999)^0}$$

6. (12 points) Decide if the following statement is True or False:

$$(5!)^2 \text{ is divisible by } 7!$$

Explain your answer without using long division.

Choose one of the following two problems. If you do both I will only grade the first one.

7. (16 points) Prove the following statement using algebra: Suppose both A and B are whole numbers divisible by 5. Show that $A + B$ is also divisible by 5.

8. (16 points) Prove the following statement using picture proof: the sum of any five consecutive whole numbers is divisible by 5.

9. (12 points) Use either expanded form of the number or base blocks to illustrate the method of divisibility by 9 to find the remainder when dividing 95,436 by 9 (without doing the long division or using the standard unbundling techniques).