Algebra Test

1. (3) Farmer Spock raises 2 types of creatures: Zaps and Gooks. Zaps are creatures with 3 legs and 4 eyes. Gooks are creatures with 5 legs and 1 eye. On Spock's farm, there are a total of 45 legs and 43 eyes, not including him. How many creatures are on Spock's farm?

2. (3) In February 2015, the Martins watched TV for 2 hours every Monday and Thursday, 3 hours every other Tuesday, and 4 hours every Friday and Saturday. They never watched TV on any other day. How many hours of TV did they watch that month?

3. (3) The function $a \star b$is defined as $(a + b)^{a-b}$. What is $(6 \star 4) \star 98$?

4. (4) An army gives its soldiers 10 ounces of vegetables each day, allowing an army of 800 soldiers to have enough provisions for 6 weeks. With the same amount of provisions, how many soldiers could be fed for 10 weeks if each soldier receives only 4 ounces of vegetables each day?

5. (4) If $p + \frac{1}{p} = 2014 + \frac{1}{2014}$and $q + \frac{1}{q} = 2015 + \frac{1}{2015}$, what is the largest possible value of $p - q$? This value can be expressed in the form $\frac{a}{b}$; what is a + b ?

6. (5) What is the greatest number of 3 by 5 notecards that can be cut from a 26 by 28 sheet of posterboard, assuming every cut must be made parallel to a side of the poster board and no taping or gluing is allowed?

7. (5) A collection of 25 coins made up of only nickels, dimes, and quarters has a total value of $3.85. If the dimes were nickels, the nickels were quarters, and the quarters were dimes, the collection of coins would have a total value of $3.00. How many quarters are in the original collection?

8. (5) In Ian's chemistry experiments, he adds 3 milliliters of water to a 40% acid solution. Then, he adds 10 milliliters of 60% acid solution to the mixture, creating a 50% acid solution. How many milliliters of solution did he start with?

9. (6) For positive integers A and Q, it is true that $125 \times A = 5^{Q-3}$, A > 100 , and $\frac{A}{Q}$is an integer. What is the smallest possible value of $\frac{A}{Q}$? This value can be expressed in the form a^b; what is a x b?

10. (6) A teenager is someone who is 13 to 19 years old, inclusive. If the product of the ages of a particular group of teenagers is 11,007,360, what is the mean of their ages?