Math5900 Final Exam Spring, 2006 Kelly MacArthur

Name_____ Date_____

Instructions: Please show all your work, as partial credit will be given where appropriate. If there is no work shown, you may not get any points for an answer, even if it's correct. Please put your answer in the designated place. Each question is worth 10 points.

1. Solve this quadratic equation.
   $(x-3)^2-25=0$

x = _____

2. Solve this linear equation (i) using a diagram and (ii) with algebra notation.
   2(-x + 1) – 3x = 3x – 6

x = _____

3. Solve these systems of linear equations.

(a) $$\begin{aligned} x+3y&=-7 \\ -2x-4y&=8 \end{aligned}$$

Answer 3(a): _____

(b) $$\begin{aligned} y&=4x-3 \\ 2x-\frac{1}{2}y&=\frac{3}{2} \end{aligned}$$

Answer 3(b): _____

4. A grocer wants to mix candy corn and jelly beans together to sell. Candy corn sells for $1.75 per pound and the jelly beans are $3.20 per pound. She wants 25 pounds of candy mix that costs $2.33 per pound. How many pounds of each type of candy is in the mixture?

pounds of jelly beans = _____

pounds of candy corn = _____

5. Convert these numbers to a different base as indicated.

(a) 761_8 to base 10 = _____

(b) 4444 to base 4 = _____

(c) 11100101_2 to base 10 = _____

6. Convert all these numbers (as necessary) to fractions, order these numbers and then place them on a number line. (No calculator allowed, i.e. I want to see all your work.)

(a) 64% = _____

(b) $\frac{1}{3}$

(c) $\frac{2}{9}$

(d) $\frac{5}{16}$

(e) $\frac{3}{10}$

(f) $0.\overline{9}$ = _____

(g) 0.61 = _____

(h) $\frac{9}{10}$

(i) 47% = _____

(j) $0.\overline{65}$ = _____

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7. A 51-row auditorium seats 20 people in the first row, 21 in the second row, 22 in the third row and so on. Use short-cuts to find the total number of seats in the auditorium.

seats = _____

8. The product of two numbers is 792 and their difference is 9. What are the two numbers?

_____ and _____

9. For the sequence 5, 13, 21, 29, ...

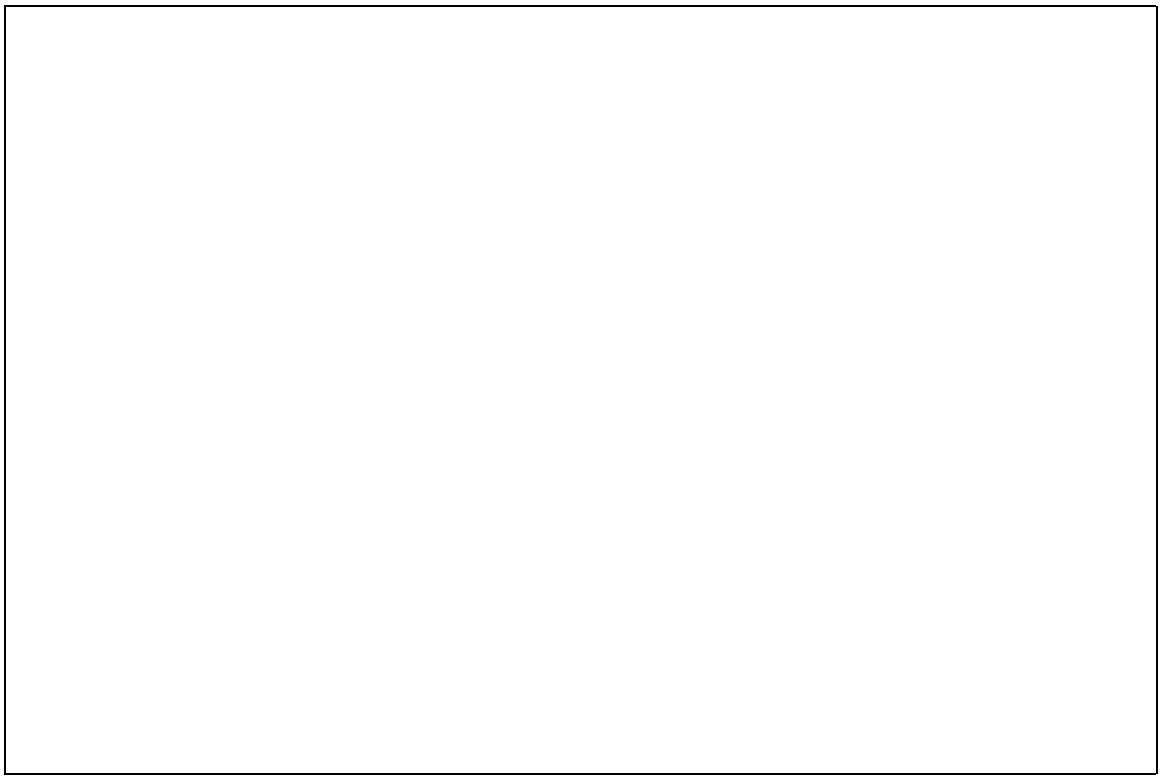
(a) Find a formula to give the nth term of the sequence.

Formula: _____

(b) What is the 200^{th} term?

200^{th} term = _____

10. Draw a Venn Diagram for all the number systems (including fractions) and place these numbers in the proper place in the Venn Diagram.
    (a) -5.1
    (b) $\frac{2}{7}$
    (c) 6.34
    (d) 0
    (e) 11.343343334...
    (f) $21.9\overline{87}$
    (g) $\sqrt{5}$
    (h) $\frac{15}{3}$
    (i) -9
    (j) $0.\overline{9}$



11. Perform the following arithmetic operations. For part (a), use two methods, and for (b) & (c) use one method to show your work. (You cannot choose the standard algorithm for (b) or (c)!)

(a) $236 \div 7$ = _____ (Use one partitive method and one measurement method.)

(b) $4231 \, x \, 5$ = _____

(c) 16 – 19 = _____

12. Find the GCF and LCM of the following pair of numbers. (You can leave your answers in factored form, if you'd like.)

(a) GCF(980, 1750) = _____

(b) LCM(980, 1750) = _____

13. Simplify.

$$\frac{1}{4}\left(\frac{3^6}{6^2}\right)+\frac{3}{4}\div 2\cdot\frac{2}{5}+\frac{1}{2}$$ = _____

14. A young man spent $\frac{1}{4}$ of his allowance on a movie. He spent $\frac{11}{18}$ of the remainder on after-school snacks. Then from the money remaining, he spent $3.00 on a magazine, which left him $\frac{1}{24}$ of his original allowance to put into savings. How much of his allowance did he save?

Answer 14: _____

15. An airline passenger fell asleep halfway to her destination. When she awoke, the distance remaining was half the distance traveled while she slept. How much of the entire trip was she asleep?

Answer 15: _____

16. Barry said that to find $\frac{1}{3}$ of a number, he just had to multiply by 0.3, so that $\frac{1}{3}$ of 54, for example, would equal 16.2. Do you agree with Barry? Explain your reasoning.

17. Maria multiplied $\frac{15}{7}$ and $\frac{14}{9}$ and got $\frac{210}{63}$. She says that the answer in simplest form is $\frac{10}{3}$. Karl disagrees with Maria and says that the answer in simplest form is $3\frac{1}{3}$. Who is correct (or are they both correct or both incorrect)? Explain your reasoning.

<u>Choose one of the following three questions to answer</u>. Indicate clearly which one you are answering!!!

A. In your own words, what is a definition of algebraic thinking?
B. What is the essence of mathematics? Explain why underlying mathematical skills are important in daily life.
C. Explain why 0 and 1 are such "powerful" numbers.