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And This is the Tale That Xeno Told

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APPENDIX C

MATH 354 SPRING 1990 WRITING ASSIGNMENT

1. Write a 1-2 page paper explaining the concepts of ring, commutative ring, unity, units, ideal, field, etc. Include some examples. Explain notation.
2. For any element a in a ring R , define $\langle a \rangle$ to be the smallest ideal of R that contains a . If R is a commutative ring with unity, show that $\langle a \rangle = aR = \{ar \mid r \in R\}$.
3. Let R be a commutative ring with more than one element. Prove that if for every non-zero element a of R , we have $aR = R$, then R is a field.

PAPER: Prove the following theorem.

Theorem. Let R be a commutative ring with unity. Suppose the only ideals of R are $\{0\}$ and R . Show that R is a field.

DUE DATES: EXERCISE 1 Feb. 4
EXERCISE 2 Feb. 11
EXERCISE 3 Feb. 18
DRAFT (TYPED) Mar. 8
FINAL PAPER Apr. 8

APPENDIX D

Your grade on the paper will be based on the following:

Knowledge of math

- insight
- clear, concise, complete
- examples
- notation, symbols, variables
- accurate

Originality

- independent thought
- audience

Organization

- orderly, logical manner
- smooth transitions
- intro and conclusion

Vocabulary

- math vocabulary
- word choice

Sources

- references in text
- bibliography

Grammar

And This is the Tale That Xeno Told

*Sandra Z. Keith
St. Cloud State University*

Remember great Achilles, most handsome, lithe and tall...
You sing of your Olympians—why he'd outrun them all!
Achilles favored turtle soup, but to obtain that feast,
He had, you understand, to stoop and catch the beast.
Imagine! Great Achilles—was challenged by a turtle!
Said Turtle: "you can't catch me!", but Achilles merely chortled;
"I walk ten times as fast as you—I'll catch you near or far!"

He said he'd give the beast a start; he'd yield a thousand yards.
He was not man but demi-god, and had to save his face,
For all the gods had gathered there to watch that famous race.

Great Zeus himself! And Phoebus, too—the driver of the Sun;
Sly Hermes, grim Haefestus, all the Muses, every one!
I can't describe them all, you know, the clever and the mighty,
But goddesses were there as well—Diana, Aphrodite!

Now to assure for fairness, so there'd be no dirty pool,
Lord Zeus in his great wisdom laid down this rigid rule:
Achilles mustn't run or jump or reach ahead with spear
No matter how annoyed he is, and never-mind how near.
There'd be no victory turtle feast and no festivities
Until he comes upon the point where haughty Turtle is.
(A straight line, too, is de rigeur, a changing path no-go;
The turtle yet was ignorant of present times LOGO.)

Achilles with an easy stride, through a thousand yards did fare;
But when he got to Turtle's start...the turtle wasn't there!
The turtle now, you understand, was a hundred yards ahead,
So to complete this hundred yards, Achilles promptly sped.
Alas now, magic goal, ten yards! Although by far no "league",
Achilles with a blistered foot, experienced some fatigue.

What! One yard more? He got there too, but only to discover
There still was something like four inches more he had to cover!
"The race is won!" Achilles thought, "This race is such a cinch!"
And yet to his surprise he found there yet was three-eighths inch!
(Achilles hated fractions: in school he somehow missed them;
He hoped that all his troubles would be solved by the metric system.)

I'm getting bored, and so are you. I shall condense the rest.
As time went on, Olympic gods as well lost interest.
They went quite far away, in fact, to their respective stars:
Zeus to the planet Jupiter, and Ares—off to Mars.
Hermes, of course, to Mercury and Aphrodite to Venus.
(In this way though forgotten, they still aspire to please us.)
And the Muses—ah the Muses! Imagine if you're smart—
How all those ancient Muses would react to modern art!
But sadder yet to think upon—unless they all deceive us...
Is how that cruel Gravity messed up the poor god Phoebus!

Still, if you look in microscopes, I'm sure that you will find
It's zero millimeters that Achilles lags behind.
Achilles often sulks you know, but now he's getting mad.
The viewpoint of the turtle, though, is: things are not so bad.
If he will only persevere, and persevere he will!
(He has some hopes as to the rumors 'bout Achilles' heel.)

And while the situation here appears to becoming static,
It forms a classic stumbling block of modern mathematics.
And if you think, dear student, that all this isn't serious...
Indeed it is. In fact, it's called "convergence of the series".
When does the turtle meet his doom? Consider, and decide:
When he's gone a thousand over nine. Take pencil and divide!