ALGEBRA II

Assignment 3

Due March 1, 2009

Student: ZIM!

Class: Irken Algebra 101

Instructor: Almighty Tallest Purple

Text: Extraterrestrial Algebra for Conquerors

Remember your axioms:

$x + \mathbf{O} = x$ (Additive Identity)

$x + x = \mathbf{O}$ (Autonegativity) ← This one is just dumb.

$x + y = y + x$ (Commutativity of Addition)

$x + (y + z) = (x + y) + z$ (Associativity of Addition)

$x * \mathbf{I} = x$ (Multiplicative Identity)

$x * y = y * x$ (Commutativity of Multiplication)

$x * (y * z) = (x * y) * z$ (Associativity of Multiplication)

$x * x^{-1} = \mathbf{I}$ (Multiplicative Inverse – All x except $x = \mathbf{O}$ have a unique inverse x^{-1})

$x * (y + z) = x * y + x * z$ (Distribution)

Problems:

1) $\mathbf{W} + \mathbf{I} = ?$
2) $y = x^8 + x + \mathbf{R}$. Solve for y.
3) $\mathbf{R}^3 + \mathbf{R} + \mathbf{I} = ?$
4) $\mathbf{A}x + \mathbf{H}y + \mathbf{I}z = \mathbf{I}$
   $\mathbf{M}x + \mathbf{R}y + \mathbf{T}z = \mathbf{T}$
   $\mathbf{H}x + \mathbf{A}y + \mathbf{R}z = \mathbf{A}$ Solve for x, y, and z.
5) $\mathbf{R} * \mathbf{W} = ?$
6) $(x + \mathbf{W})^2 = \mathbf{R}$. Solve for x.
7) $\mathbf{W} + \mathbf{R} + \mathbf{A} + \mathbf{T} + \mathbf{H} = ?$
8) $x + \mathbf{T} = \mathbf{H}$. Solve for x.

Irken Algebra 101

Handout #7

Invader Skoodge had the temerity to ask why

$x * \mathbf{O} = \mathbf{O}$

isn't listed as an axiom.

It's not an axiom because it can be derived from the other axioms, like so:

$x * \mathbf{O}$

$= x * (\mathbf{I} + \mathbf{I})$ (Autonegativity)

$= x * \mathbf{I} + x * \mathbf{I}$ (Distribution)

$= x + x$ (Multiplicative Identity)

$= \mathbf{O}$ (Autonegativity)

Really, Skoodge, could you *be* any shorter?

Solutions to selected problems from Assignment 2:

1) $x + \mathbf{W} = \mathbf{R}$. Solve for x.
   $(x + \mathbf{W}) + \mathbf{W} = \mathbf{R} + \mathbf{W}$ (Adding $\mathbf{W}$ to both sides)
   $x + (\mathbf{W} + \mathbf{W}) = \mathbf{R} + \mathbf{W}$ (Associativity of Addition)
   $x + \mathbf{O} = \mathbf{R} + \mathbf{W}$ (Autonegativity)
   $x = \mathbf{R} + \mathbf{W}$ (Additive Identity)
   $x = \mathbf{H}$.
2) Invader Larb has conquered $\mathbf{H}$ times as many puny civilizations as Invader Spleen has. Larbhas conquered $\mathbf{W}$ puny civilizations. How many puny civilizations has Spleen conquered?
   Let $x =$ the number of puny civilizations conquered by Larb, and
   $y =$ the number of puny civilizations conquered by Spleen.
   Then we have the equations:
   $x = \mathbf{H} * y$ and
   $x = \mathbf{W}$. Substituting,
   $\mathbf{H} * y = \mathbf{W}$
   $y * \mathbf{H} = \mathbf{W}$ (Commutativity of Multiplication)
   $(y * \mathbf{H}) * \mathbf{H}^{-1} = \mathbf{W} * \mathbf{H}^{-1}$ (Multiplying by $\mathbf{H}^{-1}$ on both sides)
   $y * (\mathbf{H} * \mathbf{H}^{-1}) = \mathbf{W} * \mathbf{H}^{-1}$ (Associativity of Multiplication)
   $y * \mathbf{I} = \mathbf{W} * \mathbf{H}^{-1}$ (Multiplicative Inverse)
   $y = \mathbf{W} * \mathbf{H}^{-1}$ (Multiplicative Identity)
   $y = \mathbf{W} * \mathbf{A}$
   $y = \mathbf{R}$.