

Solutions and Notes to Michael Spivak's  
*Calculus*

Community

# 1 Basic Properties of Numbers

## 1.1

Prove the following.

### 1.1.1

If  $ax = a$  for some number  $a \neq 0$ , then  $x = 1$ .

$$ax = a$$

$$x = \frac{a}{a}$$

$$x = 1$$

### 1.1.2

$$x^2 - y^2 = (x - y)(x + y)$$

$$x^2 - y^2 = x^2 + xy - xy - y^2$$

$$x^2 - y^2 = x^2 - y^2$$

## 1.2

What is wrong with the following "proof"? Let  $x = y$ .

$$(x + y)(x - y) = y(x - y)$$

$$x + y = y$$

We divide by  $(x - y)$ , which given  $x = y$  equals 0. We cannot divide by zero.