A Note of Calculus-Michael Spivak

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23rd June, 2017

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Preface

This is the note for the book Calculus writtten by Michael Spivak, citing what I think the most interesting and important subjects mentioned in the book.

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Part I

Prologue

Chapter 1

Basic properties of number

(P1) If a, b, and c are any numbers, then

$$a + (b + c) = (a + b) + c$$

See **problem 24** for the generalization of $a_1 + a_2 + a_3 + \cdots + a_n$ for (P1).

The number 0 has important properties.

(P2) If a is any number, then

$$a + 0 = 0 + a = a$$

(P3) For every number a, there is also a number $-a$ such that

$$a + (-a) = (-a) + a = 0$$

We now prove lemma 1.

Lemma 1. *If $a + x = a$, then $x = 0$*

Proof.

If	$a + x = a$	
then	$(-a) + (a + x) = (-a) + a = 0$	$(by\ (P3))$
hence	$((-a) + a) + x = 0$	$(by\ (P1))$
hence	$0 + x = 0$	$(by\ (P3)\ again)$
therefore,	$x = 0$	$(by\ (P2))$

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