Math 365 Lecture Notes
Section 4.1 – Integers and the Operations of Addition and Subtraction

☆Representation of Integers

Definitions:

1) Integers:

2) Absolute Value:

The use of " – " and what it means:

- x is not always negative!

Of historical interest: **- 4 =** $\overset{o}{4}$ **=** (4)

☆Integer Addition

Signed Counter Model: Uses positive and negative counters to make zero pairs and simplify expressions.

$3 + {}^{-}5$

${}^{-}2 + 7$

Pattern Model: Establish a pattern with *previously* known facts and then continue the pattern to learn new facts.

$3 + {}^{-}5$ ${}^{-}2 + 7$

Number Line Model: Start at zero with the man facing in the positive direction. Positive integers move the man forward, negative integers move the man backwards.

$3 + {}^{-}5$

$\bar{2} + 7$

☆Integer Subtraction

Definition of Subtraction:

Property for Subtraction:

Signed Counter Model:

$3 - \bar{5}$ → Subtract, or remove, 5 negative chips from 3 positive chips.

$\bar{2} - 7$ → Subtract, or remove, 7 positive chips from 2 negative chips.

Pattern Model:

$3 - \bar{5}$ $\bar{2} - 7$

Number Line Model: Start at zero with the man facing in the positive direction. Positive integers move the man forward, negative integers move the man backwards. The operation of subtraction corresponds to facing the man in the negative direction.

$3 - \bar{5}$

$\bar{2} - 7$

☆Properties

For $a, b, c \in I$

Closure property of addition of integers –

Commutative property of addition of integers –

Associative property of addition of integers –

Identity element of addition of integers –

Uniqueness Property of the Additive Inverse – For every integer a, there exists a unique integer ^{-}a, the additive inverse of a, such that

Properties of Additive Inverse

1) $^{-}(^{-}a) =$
2) $^{-}a + ^{-}b =$

Order of Operations

{ } , [ ] , ( ) , _____ Grouping symbols first!
Exponents: powers and roots
Multiplication and Division: in order from left to right!
Addition and Subtraction: in order from left to right!!