Important Concepts . . .

Preview Review

Mathematics Grade 7

W1 - Lesson 5: Integers and Number Lines

Important Concepts of Grade 7 Mathematics

Materials Required

Math Set
Calculator

No Textbook Required

This is a stand-alone course.

Mathematics Grade 7
Version 6
Preview/Review W1 - Lesson 5
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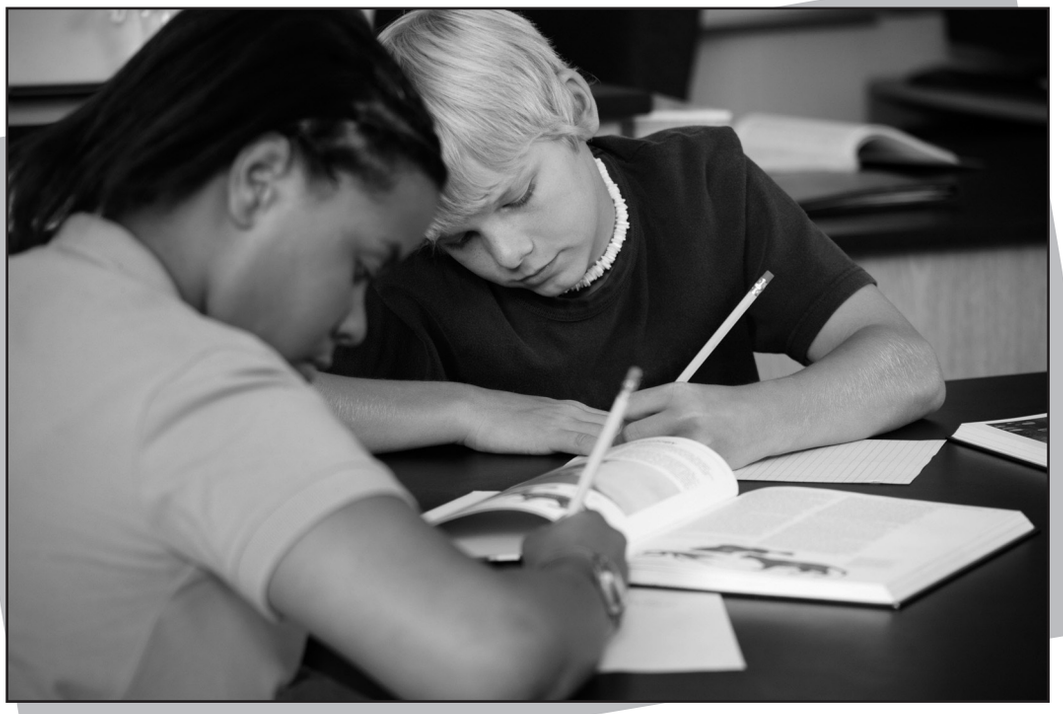
Preview/Review Concepts for Grade Seven Mathematics



W1 – Lesson 5:

Integers and Number Lines

W1 – Lesson 5: Integers and Number lines

Review:

- *Integer basics.*

Positive integer: a number greater than zero. Sometimes indicated by a plus sign (+).

Examples: +5, +72, +56

Negative integer: a number less than zero. Always indicated by a minus sign (-).

Examples: -25, -90, -34

Absolute value: The value of a number without regard to its sign.

Example: +7 and -7 both have an absolute value of 7.

Additive inverse: a number with the same absolute value, but opposite sign.

Example: -6, additive inverse is +6.

Practice:

Write an integer to represent each situation.

a. Four years before now

b. 25 degrees below freezing

c. 11 floors above ground level

d. 40 m below sea level

Arranging Integers

Zero as a reference point:
A positive integer is like "normal" numbers. The larger the absolute value, the greater the integer.
35 < 78

A number that is negative is smaller than zero, the greater the absolute value of a negative number, the smaller the integer is. -35 > -78

Practice:

Arrange the following integers in order from least to greatest.

a. -24, -15, 11, 9, -2

b. 0, -4, 12, 7, -2, 8

c. 12, -5, 7, 0, -9, 1

Objective:

- *I can use manipulatives to model integers.*

Positive integer: represented by a clear tile 

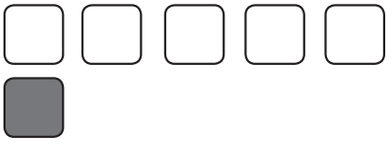
Negative integer: represented by a shaded tile 

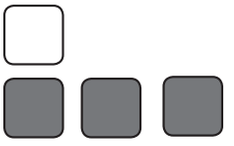
Zero pair: to model zero, a positive tile combined with a negative tile. 

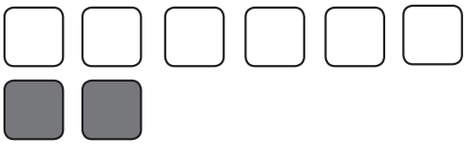
Examples:

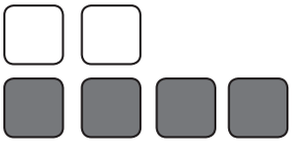
a.  = 4

b.  =-2

c.  = 4

d.  =-2

e.  = 4

f..  =-2

Practice:

Draw two different models for the integer.

a. -5

b. 6

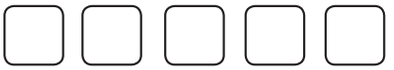
Objective:

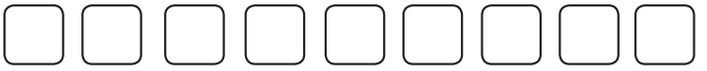
- *I can use manipulatives to model the sum of integers.*

Examples:

Adding two positive integers: (+5) + (+9)

Count the total = (+14)

+5: 

+9: 

Adding two negative integers: (-2) + (-7)

Count the total = (-9)

-2: 

-7: 

Adding a positive and a negative integers: (+4) + (-6)

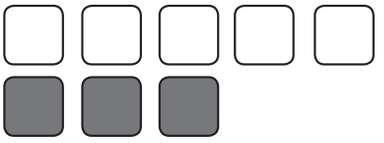
Count the remaining tiles after the zero pairs = (-2)

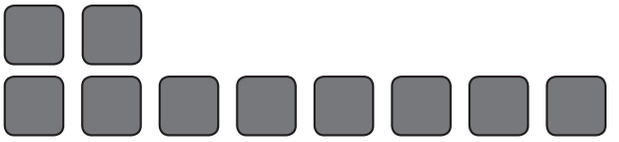
+4: 

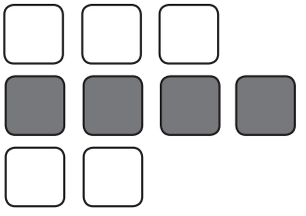
-6: 

Practice:

1. Write the addition equation represented by the following tiles.

a. 

b. 

c. 

2. What is the sum of

a. 2 white tiles and 5 shaded tiles

b. 3 white tiles and 7 shaded tiles

c. 6 white and 4 shaded

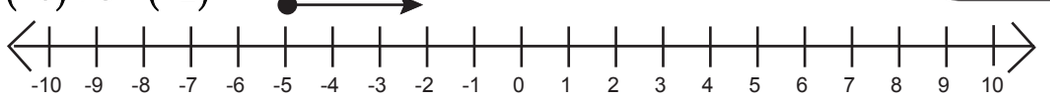
d. 2 white and 2 shaded

When solving addition equations using a number line, start at the first number. Draw a line the length of the second number in the correct direction:
add a positive - right
add a negative - left
Read the number where the line ends

Solving addition of integers using a number line:

Examples:

$(-5)+3=(-2)$



$(3)+(-5)=(-2)$

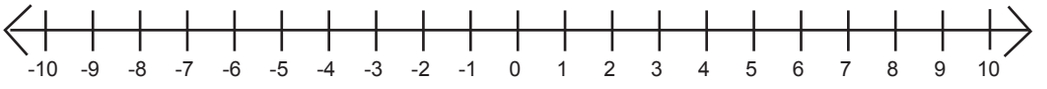
Practice

1. Show the sum on the number line.

   a. $7+(-8)=$

   b. $(-2)+(8)=$

   c. $(-3)+(-2)=$



2. Solve.

   a. $(-5)+(+9)=$ b. $(+8)+(+4)=$ c. $(-4)+(+6)=$

   d. $(+7)+(-3)=$ e. $(+9)+(-5)=$ f. $(-7)+(-9)=$

   g. $(-9)+(-3)=$ h. $(-43)+(-27)=$ i. $(+4)+(-9)=$

   j. $(-70)+(+1)=$ k. $(-2)+(+5)=$ l. $(-20)+(+92)=$

   m. $(-6)+(+7)=$ n. $(+19)+(+2)=$ o. $(-15)+(+8)=$

Objective:

- *I can use manipulatives to model the difference of integers,*

Subtracting integers:
To find the difference between two numbers, **add** the **additive inverse**.

Examples:

Subtracting two positive integers: (+9) - (+3)

+9: 

Minus (+3)

Count the total = (+6)

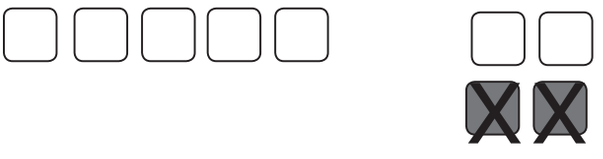
Subtracting two negative integers: (-4) - (-6)

-4: 

Minus (-6): but there are not enough – add zero pairs

Count the total remaining tiles= (+2)

Subtracting a negative from a positive integer: (+5) - (-2)

+5: 

Minus (-2): but there are no negative tiles to take away – add zero pairs

Count the remaining tiles = (+7)

Subtracting a positive from a negative integer: (-6) – (3)

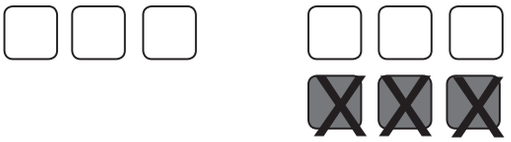
-6: 

Minus (3): but there are no positive tiles to take away – add zero pairs

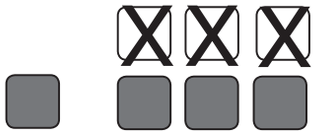
Count the remaining tiles = (-9)

Practice:

1. Write the subtraction equation represented by

a. 

b. 

c. 

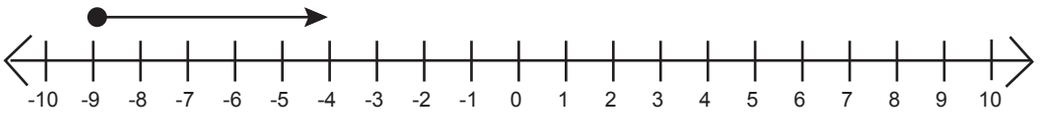
Solving subtraction of integers using a number line:

Examples:

Note: the arrow moves in the **opposite** direction when subtracting.

$(-5)-(+3)=(-8)$

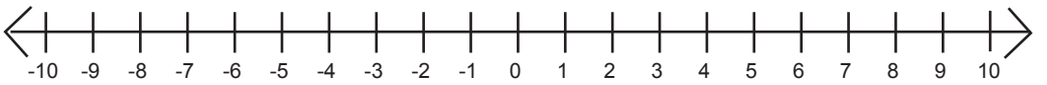
$(-9)-(-5)=(-4)$



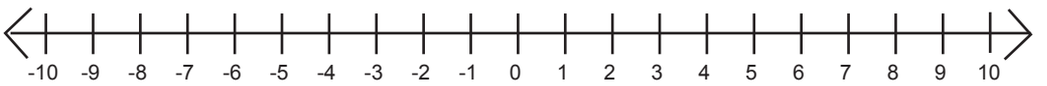
Practice

1. Show the difference on the number line.

   a. $(-3)-(-5)=$

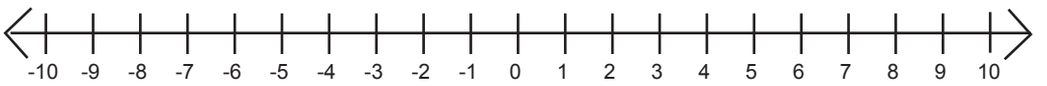


   b. $(5)-(6)=$



   c. $(4)-(-4)=$

   d. $(-8)-(-7)=$



Hint: Rather than subtracting integers, add the additive inverse..

2. Solve.

   a. $(-7)-(+8)=$ b. $(-5)-(+3)=$ c. $(+2)-(-6)=$

   d. $(+2)-(+8)=$ e. $(-8)-(-8)=$ f. $(-7)-(+1)=$

   g. $(+1)-(+9)=$ h. $(0)-(+8)=$ i. $(+9)-(-6)=$

   j. $(-1)-(+3)=$ k. $(+2)-(+2)=$ l. $(+4)-(-2)=$

Objective:

- *I can sort numbers on a number line.*

Ascending order: numbers ordered from least value to greatest value.

Descending order: numbers ordered from greatest value to least value.

To compare numbers, convert numbers into forms that are easily comparable.
Example: all decimals or all fractions

Examples:

1. Arrange $1.2,\ \frac{5}{6},\ -2.3,\ 0.83,\ -3.4$ in ascending order.

   Change to comparable forms:

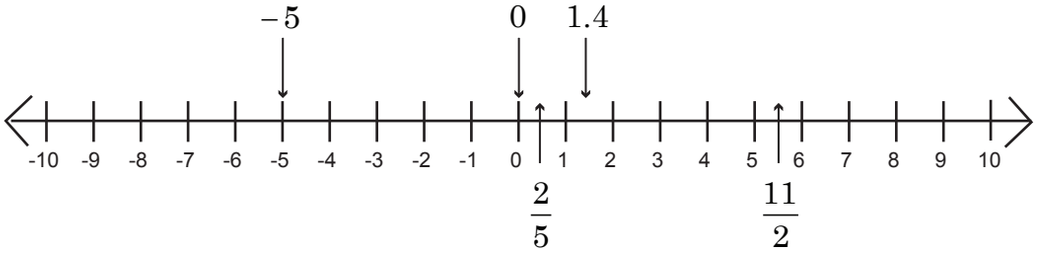
   $1.2,\ 0.8\overline{3},\ -2.3,\ 0.83,\ -3.4$

   Arrange:

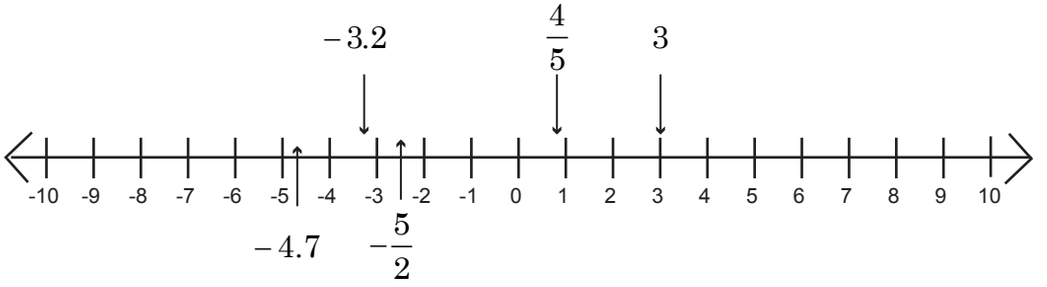
   $-3.4,\ -2.3,\ 0.83,\ \frac{5}{6},\ 1.2$

2. Arrange $\frac{11}{2},\ -5,\ \frac{2}{5},\ 0,\ 1.4$ on the number line.

$\frac{11}{2} = 5.5 \qquad \frac{2}{5} = 0.4$



3. Arrange $-\frac{5}{2},\ -4.7,\ \frac{4}{5},\ 3,\ -3.2$ on the number line.



Practice:

1. Arrange the numbers in **ascending** order.

   a. $7,\ -\frac{21}{3},\ -5.3,\ 4.5,\ 0.3$

   b. $-3,\ 4\frac{1}{2},\ 6.8,\ -\frac{2}{3},\ -0.6,\ 2.2$

   c. $-2\frac{7}{9},\ -2.8,\ -\frac{2}{8},\ 0.5,\ 1.7$

   d. $6\frac{1}{5},\ -3.3,\ -\frac{33}{5},\ 7.5,\ 0.4$

2. Arrange the numbers in **descending** order.

   a. $9,\ -\frac{54}{6},\ -4.8,\ -0.8,\ 5.6$

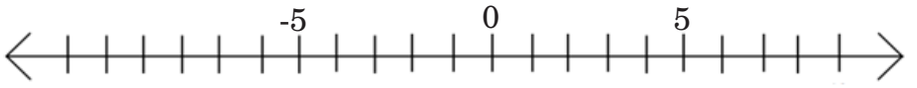
   b. $-0.2,\ 4\frac{7}{8},\ -1.9,\ \frac{38}{8},\ -6,\ 4$

   c. $-1\frac{4}{11},\ -0.7,\ \frac{6}{3},\ 1.6,\ -4$

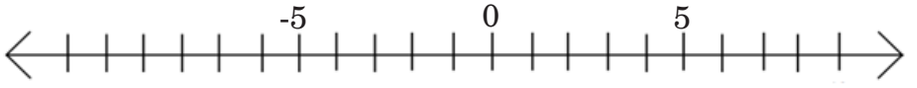
   d. $\frac{11}{5},\ -4.6,\ -\frac{12}{4},\ 5.4,\ 0$

3. Sort the following numbers on a number line.

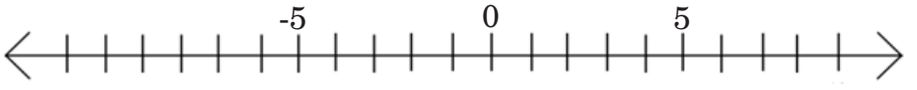
a. $1\frac{3}{7},\ 3.6,\ -2.4,\ -3,\ \frac{2}{3}$



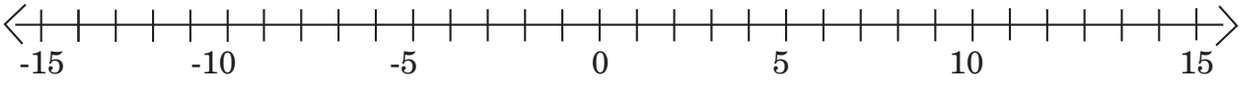
b. $\frac{14}{3},\ -2.8,\ 4.1,\ 7,\ -\frac{4}{5}$



c. $-\frac{2}{3},\ 1.4,\ 6,\ -0.5,\ \frac{4}{6}$



d. $-1.5,\ 14,\ -\frac{1}{2},\ 2\frac{2}{3},\ 6.8$



Summary:

- *Using what you learned, answer the following questions.*

1. Find the integer that best represents the sentence.

   a. 16 units to the right of -6 on a number line

   b. Deposit $310 into a bank account

   c. An altitude of 2500 feet

   d. 11 units to the left of -16 on a number line

   e. The additive inverse of 112.

   f. 45° below freezing

2. Compare two numbers by indicating if the numbers are greater than (>) or less than (<) or equal to (=).

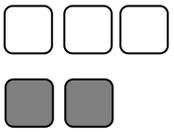
   a. -14 -28/2 b. 12 -22 c. -1/3 -0.33

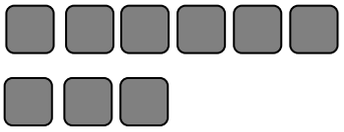
   d. 3 -2 e. 5.2 5.3 f. -1.1 -1.2

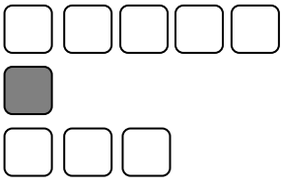
3. Draw two different models that would represent the integer

   a. -3 b. 7

4. Write an addition equation represented by the following models

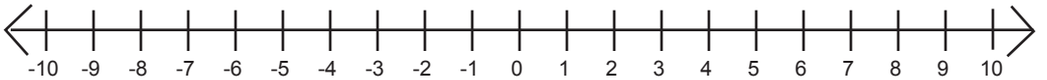
a. 

b. 

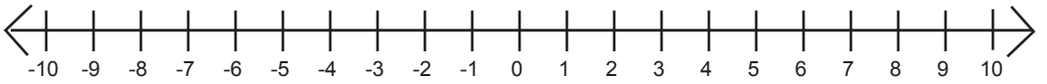
c. 

5. Model on the number line

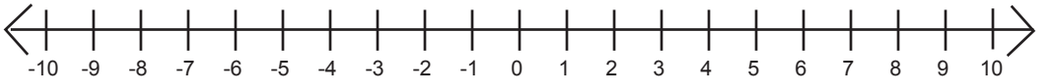
a. (-2) + 7 =



b. (3) + (-5) =



c. 7 + (-8) =



6. Solve.

a. $3 + 1 =$

b. $(-4) + (-6) =$

c. $(-2) + 0 =$

d. $6 + 1 =$

e. $10 + (-8) =$

f. $(-5) + 6 =$

g. $9 + (-6) =$

h. $(-2) + 8 =$

i. $10 + (-5) =$

j. $(-3) + 7 =$

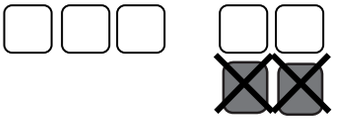
k. $(-3) + 7 =$

l. $14+ (-19) =$

7. Write a subtraction equation represented by the following models

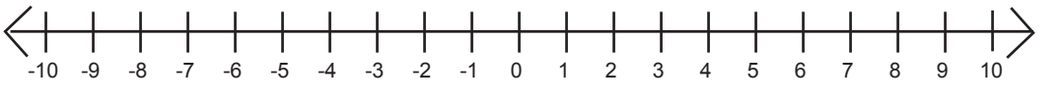
a. 

b. 

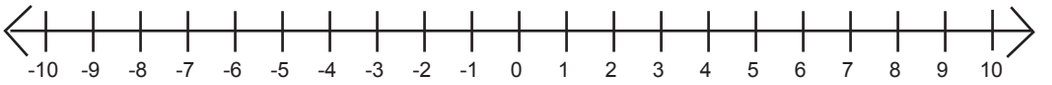
c. 

8. Model on the number line

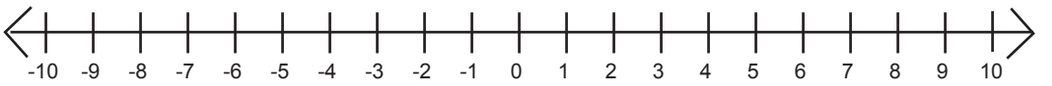
a. (6) – (2) =



b. (-3) – (3) =



c. (-6) - (-10) =



9. Solve.

a. 5 - (-5) =

b. 1 - 6 =

c. (-3) - 5 =

d. 8 - (-2) =

e. 3 - (-6) =

f. (-2) - (-7) =

g. 52 - 0 =

h. 16 - 26 =

i. (-3) – (9) =

j. 7 – (-1) =

k. 16 – 4 =

l. 2 – (-2) =

m. 14 – 7 =

n. (-14) – 7 =

10. Arrange the numbers in ascending order.

a. $6, -\frac{22}{4}, -4.3, 0.6$, *and* 2.5

b. $-7, 2\frac{1}{2}, -6.3, -2.5, \frac{2}{3}, -2.5,$ *and* 4.2

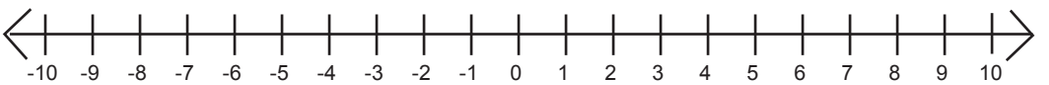
11. Arrange the numbers in descending order.

a. $8, \frac{56}{9}, -6.9, -3.8, -0.2$, *and* 6.6

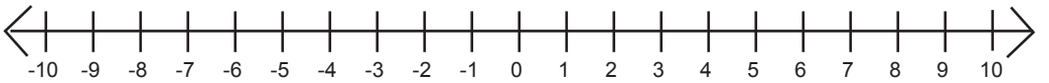
b. $-1.2, 6\frac{7}{8}, -6.9, \frac{33}{3}, -3$, *and* 7

12. Sort the following numbers on a number line.

a. $1\frac{4}{9}, -3.2, -1.4, 5, \frac{1}{3}$



b. $\frac{16}{3}, -1.3, 5.2, -3, -\frac{4}{6}$



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