Important Concepts . . .

Preview Review

Mathematics Grade 7 TEACHER KEY

W1 - Lesson 5: Integers and Number Lines

Important Concepts of Grade 7 Mathematics

W1 - Lesson 1 .....Divisibility Rules
W1 - Lesson 2 ..... Decimal Numbers
W1 - Lesson 3 .....Fractions
W1 - Lesson 4 ..... Improper Fractions, Mixed Numbers,Percents, and Decimals
W1 - Lesson 5 .....Integers, Number Lines, and Sequencing
W1 - Quiz

W2 - Lesson 1 ..... Table of Values and Graphing Linear Equations
W2 - Lesson 2 .....Modeling Expressions, Equations, and the Preservation of Equality
W2 - Lesson 3 ..... Algebra and Linear Equations
W2 - Lesson 4 .....Statistics
W2 - Lesson 5 ..... Circle Graphs and Calculating Probability
W2 - Quiz

W3 - Lesson 1 ..... Circles
W3 - Lesson 2 ..... Area of Triangles and Parallelograms
W3 - Lesson 3 .....Line Segments
W3 - Lesson 4 ..... Parts and Plotting on a Cartesian Plane
W3 - Lesson 5 .....Transformations
W3 - Quiz

Materials Required

Math Set
Calculator

No Textbook Required

This is a stand-alone course.

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

Teacher Key

W1 – Lesson 5:

Integers and Number Lines

Introductory Information for Teachers

Preview/Review courses are aimed mainly at students who have completed the regular course but who need to review some of the material before beginning the next grade. Other students may find Preview/Review courses useful in preparing for the new concepts they will study in their next grade.

No Preview/Review course is intended to replace the regular course because each covers only what the writers have decided are the top 15 concepts from the Program of Studies for that course.

Preview/Review materials are intended for use by teachers and students in one-subject and one-grade classrooms. This Preview/Review course contains fifteen lessons in three sections. Each section has five lessons. A short quiz is provided at the end of each section to test student knowledge of the material studied. In a classroom the course will likely be completed in three weeks.

This Preview/Review course is written to be stand-alone. There is no textbook required.

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
-4

b. 25 degrees below freezing
-25

c. 11 floors above ground level
+11

d. 40 m below sea level
-40

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
-24, -15, -2, 9, 11

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

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

Objective:

- *I can use manipulatives to model integers.*

Positive integer: represented by a clear tile

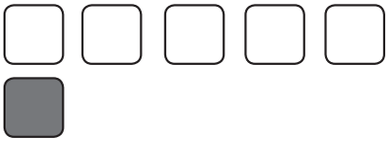
Negative integer: represented by a shaded tile

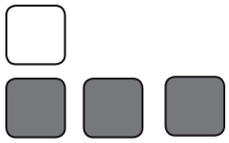
Zero pair: to model zero, a positive tile combined with a negative tile.

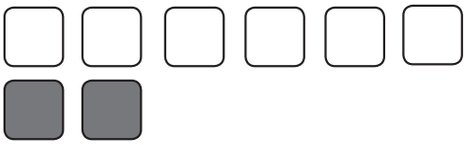
Examples:

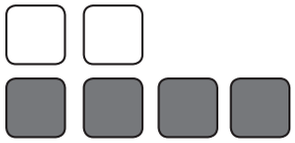
a. = 4

b. =-2

c.  = 4

d.  =-2

e.  = 4

f..  =-2

Practice:

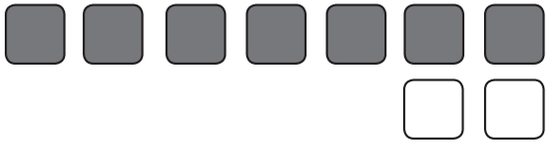
Draw two different models for the integer.

Note: Answers will vary

a. -5

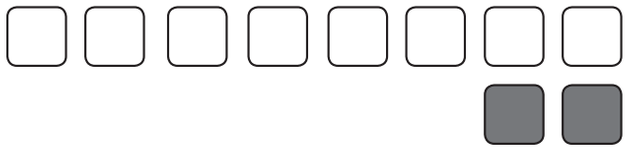
i.

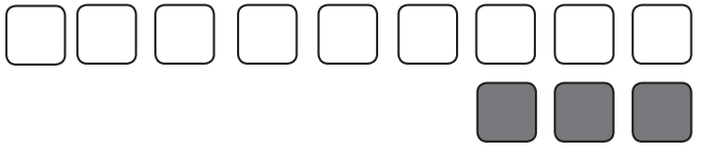
ii.

iii. 

b. 6

i.

ii. 

iii. 

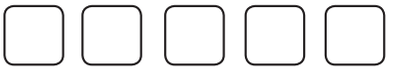
Objective:

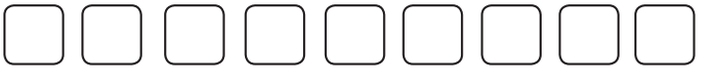
- *I can use manipulatives to model the sum of integers.*

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)

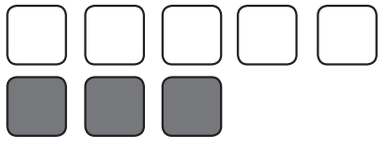
Count the remaining tiles after the zero pairs = (-2)

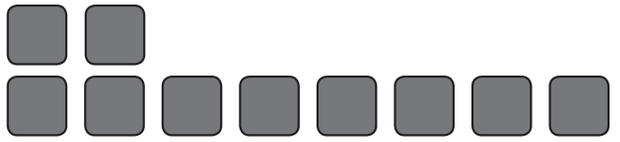
+4:

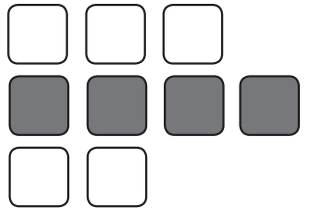
-6:

Practice:

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

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

b.  $(-2)+(-8)=(-10)$

c.  $3+(-4)+2=1$
or
5 + (-4) = 1

2. What is the sum of

a. 2 white tiles and 5 shaded tiles
-3

b. 3 white tiles and 7 shaded tiles
-4

c. 6 white and 4 shaded
2

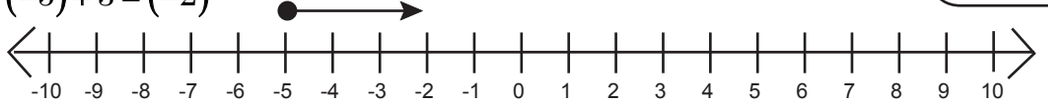
d. 2 white and 2 shaded
0

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:

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

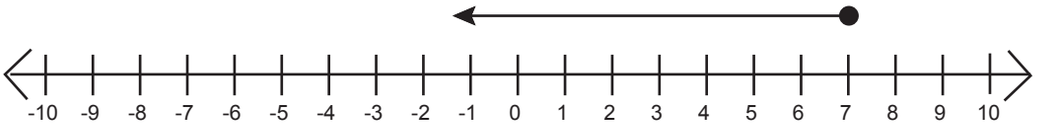


$(3)+(-5)=(-2)$

Practice

1. Show the sum on the number line.

a. $7+(-8)=$ ***–1***



b. $(-2)+(8)=$ ***6***

c. $(-3)+(-2)=$ ***–5***

2. Solve.

a. $(-5)+(+9)=$ ***4***

b. $(+8)+(+4)=$ ***12***

c. $(-4)+(+6)=$ ***2***

d. $(+7)+(-3)=$ ***4***

e. $(+9)+(-5)=$ ***4***

f. $(-7)+(-9)=$ ***-16***

g. $(-9)+(-3)=$ ***-12***

h. $(-43)+(-27)=$ ***-70***

i. $(+4)+(-9)=$ ***-5***

j. $(-70)+(+1)=$ ***-69***

k. $(-2)+(+5)=$ ***3***

l. $(-20)+(+92)=$ ***72***

m. $(-6)+(+7)=$ ***1***

n. $(+19)+(+2)=$ ***21***

o. $(-15)+(+8)=$ ***-7***

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:

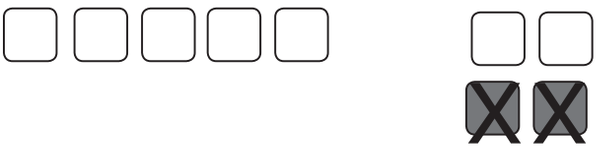
Minus (+3)
Count the total = (+6)

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)

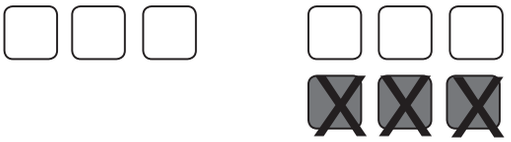
Subtracting a positive from a negative integer: (-6) – (3)

-6:

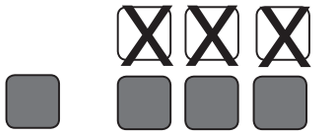
Minus (3): but there are no positive tiles to take away – add zero pairs
Count the remaining tiles = (-9)

Practice:

1. Write the subtraction equation represented by

a.  $+3-(-3)=6$

b. $(-8)-(-6)=(-2)$

c.  $(-1)-(3)=(-4)$

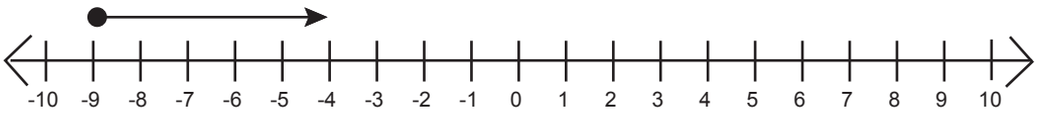
Solving subtraction of integers using a number line:

Examples:

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

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

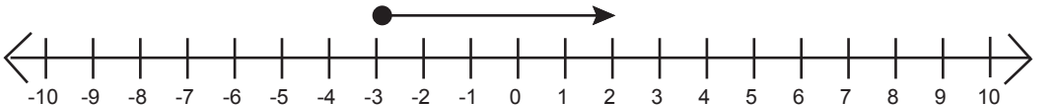
$(-9)-(-5)=(-4)$



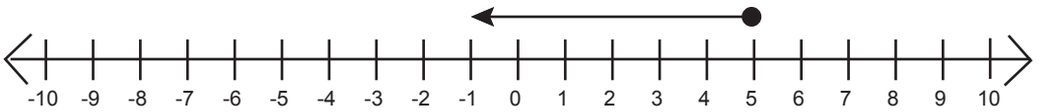
Practice

1. Show the difference on the number line.

a. $(-3)-(-5)=$ ***2***

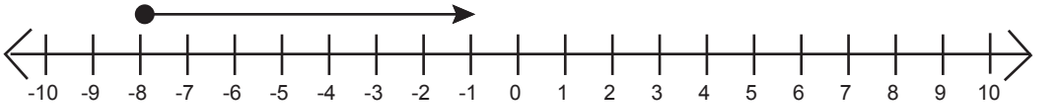


b. $(5)-(6)=$ ***(–1)***



c. $(4)-(-4)=$ ***8***

d. $(-8)-(-7)=$ ***(–1)***



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

2. Solve.

a. $(-7)-(+8)=$ ***–15***

b. $(-5)-(+3)=$ ***–8***

c. $(+2)-(-6)=$ ***8***

d. $(+2)-(+8)=$ ***–6***

e. $(-8)-(-8)=$ ***0***

f. $(-7)-(+1)=$ ***–8***

g. $(+1)-(+9)=$ ***–8***

h. $(0)-(+8)=$ ***–8***

i. $(+9)-(-6)=$ ***15***

j. $(-1)-(+3)=$ ***–4***

k. $(+2)-(+2)=$ ***0***

l. $(+4)-(-2)=$ ***6***

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:

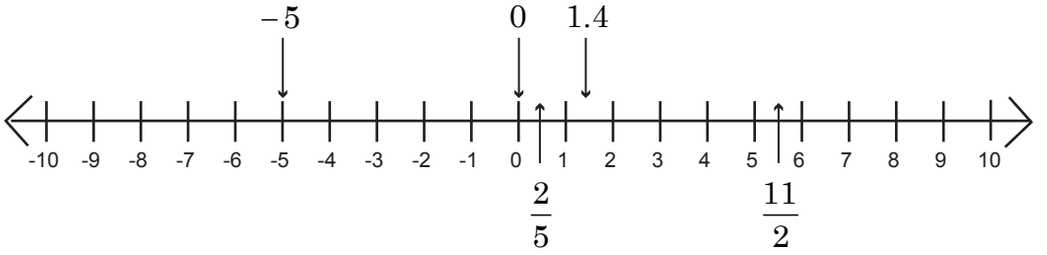
   $1.2,\ 0.8\overline{3},\ -2.3,\ 0.83,\ -3.4$

   Arrange:

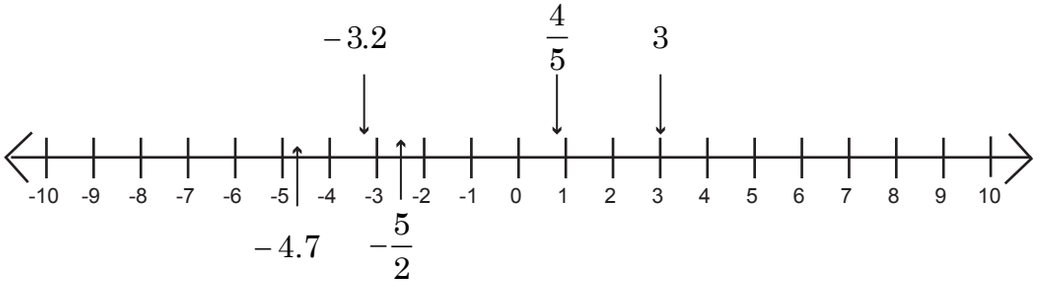
   $-3.4,\ -2.3,\ 0.83,\ \frac{5}{6},\ 1.2$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

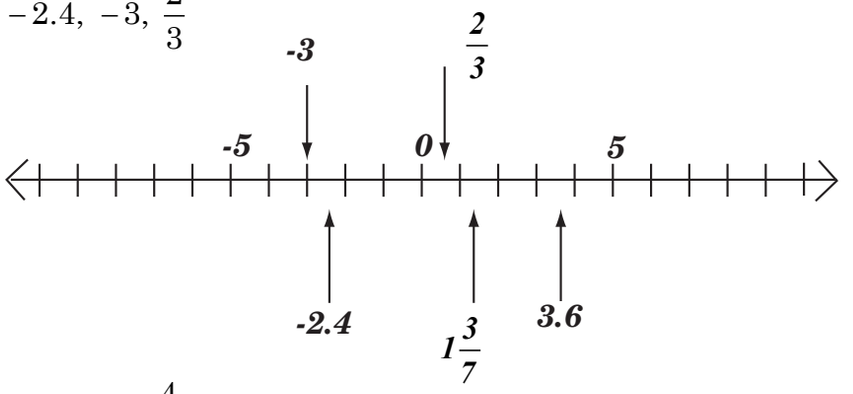
   $\frac{6}{3},\ 1.6,\ -0.7\ -1\frac{4}{11},\ -4$

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

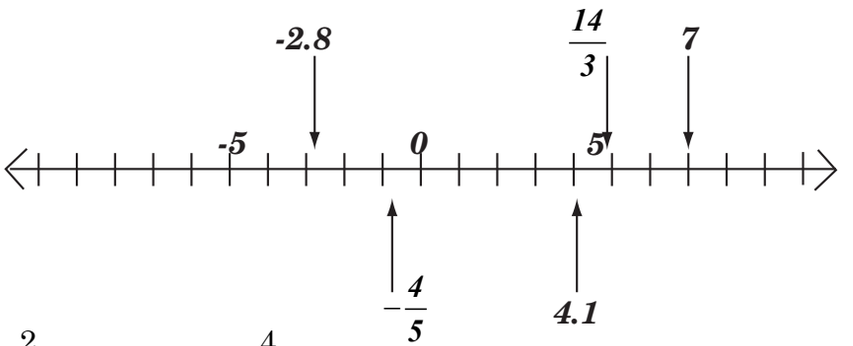
   $5.4,\ \frac{11}{5},\ 0,\ -\frac{12}{4},\ -4.6$

3. Sort the following numbers on a number line.

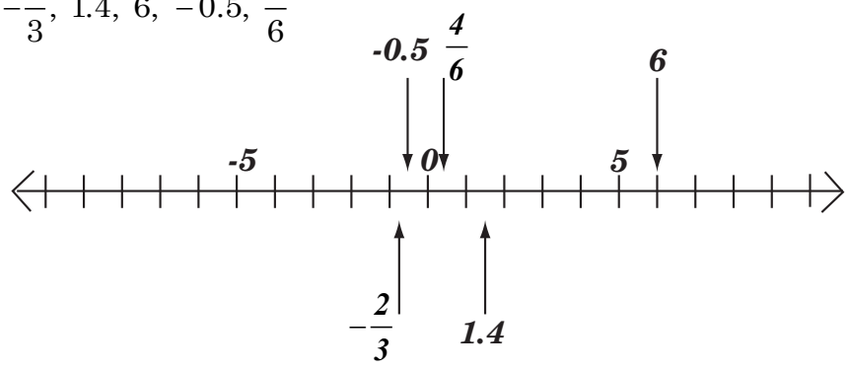
a. $1\frac{3}{7},\ 3.6,\ -2.4,\ -3,\ \frac{2}{3}$



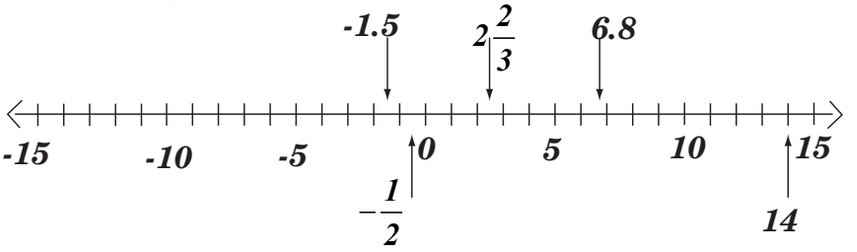
b. $\frac{14}{3},\ -2.8,\ 4.1,\ 7,\ -\frac{4}{5}$



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 ***10***

   b. Deposit $310 into a bank account ***310***

   c. An altitude of 2500 feet ***2500***

   d. 11 units to the left of -16 on a number line ***- 27***

   e. The additive inverse of 112. ***- 112***

   f. 45° below freezing ***- 45***

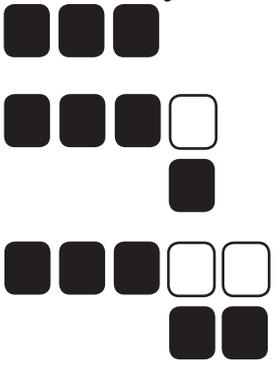
2. Compare two numbers by indicating if the numbers are greater than (>) or less than (<) or equal to (=).

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

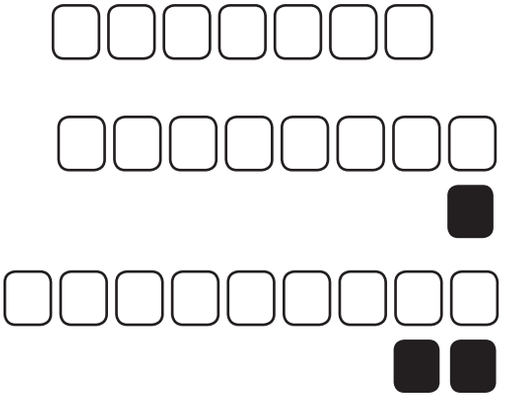
   d. 3 **>** -2 e. 5.2 **<** 5.3 f. -1.1 **>** -1.2

3. Draw two different models that would represent the integer
   Answers will vary

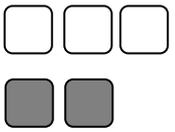
   a. -3



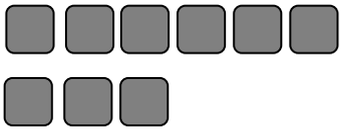
   b. 7



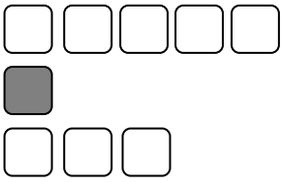
4. Write an addition equation represented by the following models

a. 

3 + (-2) = 1

b. 

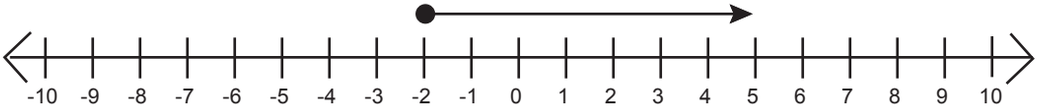
(-6) + (-3) = (-9)

c. 

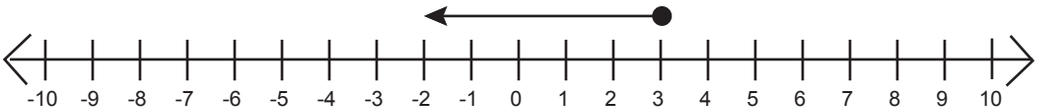
5 + (-1) + 3 = 7

5. Model on the number line

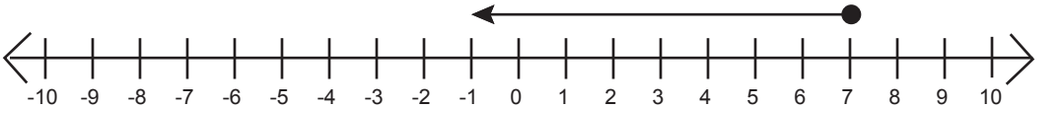
a. (-2) + 7 = ***5***



b. (3) + (-5) = ***-2***



c. 7 + (-8) = ***-1***



6. Solve.

a. 3 + 1 = ***4***

b. (-4) + (-6) = ***-10***

c. (-2) + 0 = ***-2***

d. 6 + 1 = ***7***

e. 10 + (-8) = ***2***

f. (-5) + 6 = ***1***

g. 9 + (-6) = ***3***

h. (-2) + 8 = ***6***

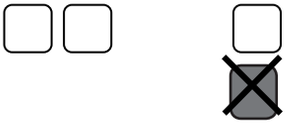
i. 10 + (-5) = ***5***

j. (-3) + 7 = ***4***

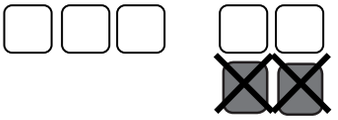
k. (-3) + 7 = ***4***

l. 14+ (-19) = ***-5***

7. Write a subtraction equation represented by the following models

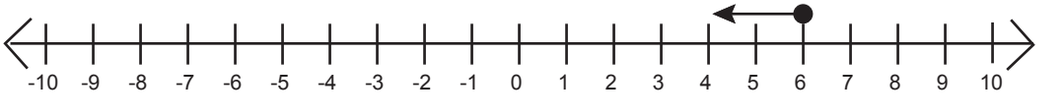
a.  ***2 – (-1) = 3***

b. ***(-6) – (-2) = (-4)***

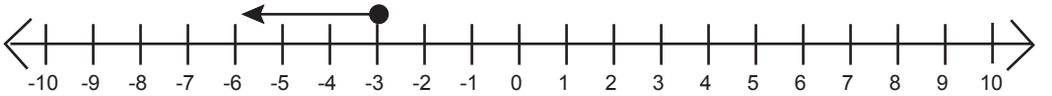
c.  ***3 – (-2) = 5***

8. Model on the number line

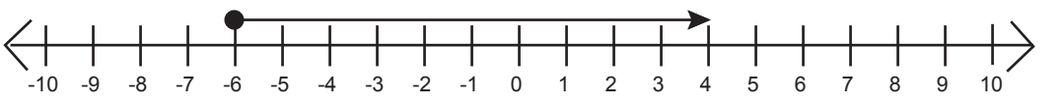
a. (6) – (2) = ***4***



b. (-3) – (3) = ***-6***



c. (-6) - (-10) = ***4***



9. Solve.

a. 5 - (-5) = ***10***

b. 1 - 6 = ***-5***

c. (-3) - 5 = ***-8***

d. 8 - (-2) = ***10***

e. 3 - (-6) = ***9***

f. (-2) - (-7) = ***5***

g. 52 - 0 = ***52***

h. 16 - 26 = ***-10***

i. (-3) – (9) = ***-12***

j. 7 – (-1) = ***8***

k. 16 – 4 = ***12***

l. 2 – (-2) = ***4***

m. 14 – 7 = ***7***

n. (-14) – 7 = ***-21***

10. Arrange the numbers in ascending order.

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

$-\frac{22}{4}, -4.3, 0.6, 2.5, 6$

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

$-7, -6.3, -2.5, \frac{2}{3}, 2\frac{1}{2}, 4.2$

11. Arrange the numbers in descending order.

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

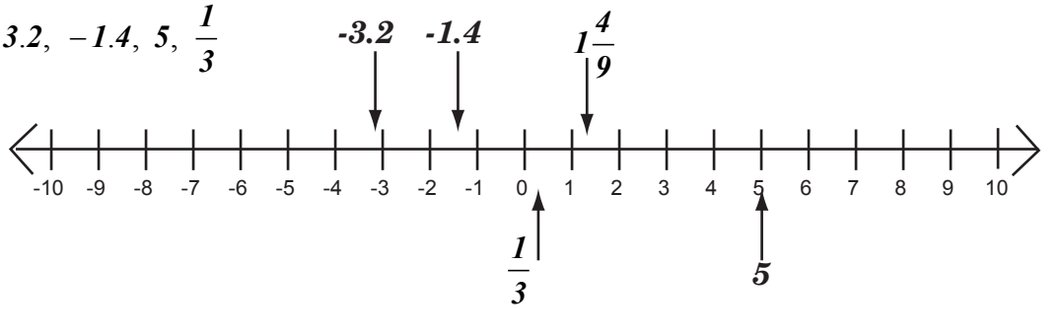
$8, 6.6, -0.2, -3.8, -\frac{56}{9}$

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

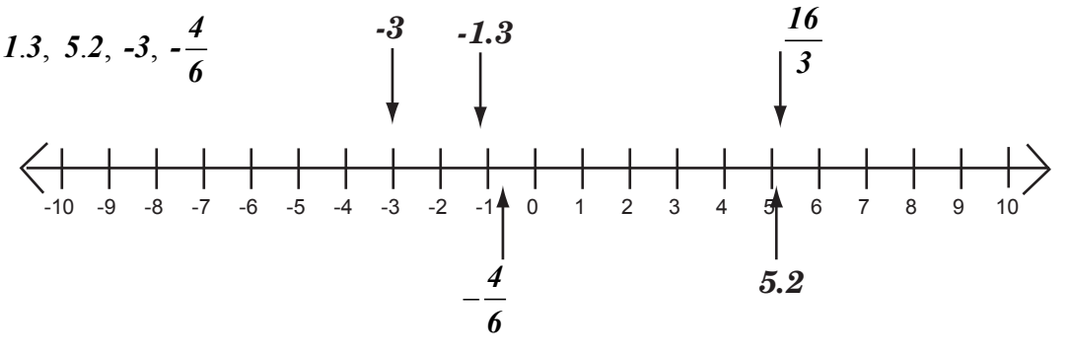
$\frac{33}{3}, 7, 6\frac{7}{8}, -1.2, -3, -6.9$

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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