

**UNIT PLANNING TOOL****Planning Focus:** Integers and Rational Numbers**Module(s)/Unit(s)** SAVVAS Alabama Topic 2

- Use signed numbers to describe quantities that have opposite directions or values and to represent quantities in real world contexts.
- Locate integers and other rational numbers on a horizontal or vertical line diagram. (opposites, real-world situations)
- Explain the meaning of absolute value and determine the absolute value of rational numbers in real-world contexts.
- Compare and order rational numbers and absolute value of rational numbers with and without a number line in order to solve real-world and mathematical problems.
- Find the position of pairs of integers and other rational numbers on the coordinate plane. (See standards for details.)

**Essential Questions**

*What are integers and rational numbers?*  
*How are points graphed on a coordinate plane?*  
 Why do we need negative and positive numbers?  
 What is absolute value?  
 How do coordinate grids help us organize information?

**Key Concepts**

Understand number lines with positive and negative values.  
 Interpret absolute value.  
 Use rational numbers and absolute value in real-world situations.  
 Extend understanding of the Coordinate Plane to all four quadrants.

**Visual Models/ Algorithms/ Diagrams for Compendium**

See attached Compendium.

**Pre and Post Assessments**

**Preassessment:** Topic 2 Readiness Assessment

**Preassessment for demo:**

- Use of  $<$ ,  $>$  and  $=$ .
- Plotting positive and negative numbers on a vertical number line
- Explanation of what they know about positive numbers, negative numbers and number lines.
- List of how we use positive and negative numbers in the “real world”.

**Less than Zero Read Aloud Activity**

What support do students need building number lines?  
 Are they able to track what is happening in the story independently?

**Post assessment:** End of topic assessment

**Connections (Real World Applications)**

- Reading thermometers/ understanding temperatures
- Borrowing and lending money
- Altitude, elevation and depth
- Sports – negative and positive yards in football
- Scaling
- Graphing data
- Technology – touchscreens
- Cartography (mapping)
- Radar – military, satellites
- Gaming

**Language Functions/Structures**

*Functions: Explain. Describe. Compare. Justify.*

The opposite of \_\_\_ is \_\_\_.

The absolute value of \_\_\_ is \_\_\_ because...

\_\_\_ is greater than \_\_\_ because... \_\_\_ is less than \_\_\_ because ...

In this context, 0 represents \_\_\_.

The y-axis is different than the x-axis because \_\_\_\_\_.

The y-coordinate (x-coordinate) is \_\_\_ because ...

The coordinates for \_\_\_ are \_\_\_\_\_. The ordered pair for \_\_\_ is \_\_\_\_\_.

I agree because ... I respectfully disagree because ...

**Vocabulary**

- |                     |                                  |                 |
|---------------------|----------------------------------|-----------------|
| • absolute value    | • rational number                | • opposite      |
| • integer           | • positive                       | • point         |
| • coordinate plane  | • negative                       | • x-axis        |
| • coordinate system | • vertical                       | • y-axis        |
| • coordinates       | • horizontal                     | • ordered pairs |
| • origin            | • quadrant(s) (I, II, III or IV) |                 |

**Focus and Motivation**

**Literature** – *Less than Zero* by Stuart Murphy (positive and negative integers)

*Sir Cumference and the Vikings Map* by Cindy Neuschwander (coordinate plane)

**Songs** - [Coordinate Plane Song](#) - Plotting Points on all 4 Quadrants

[Plotting Points on a Coordinate Plane](#) (Taylor Swift, Love Story Parody)

[Whole and Real Numbers](#) (Taylor Swift - Cruel Summer Parody)

[Coordinate Plane Song](#) | Cartesian Plane| 5th and 6th Grade Math| eSpark Music

**Animations** – Absolute Value, Coordinate Planes – brainpop.com

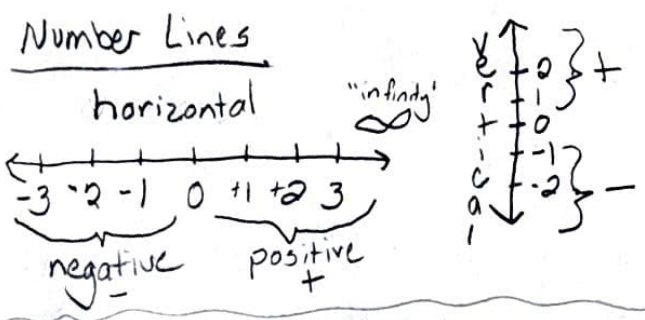
Ordered Pairs – studyjams.scholastic.com

**Game** – Game Over Gopher [mathsnacks.com](#) Coordinate Plane

Integer card games (war, Which one is greater?/ less than?)

**Human Number Line or Build a Coordinate Plane** on the floor and have students move to coordinates

Integers ... -3, -2, -1, 0, 1, 2, 3, ...  
 • Whole #s • not fractions



Real World Use of Integers

**Money** \$  
 I have \$40. (in the black) +  
 I owe \$10. (in the red) -

**Elevation**  
 200 ft above sea level +  
 below -200 ft

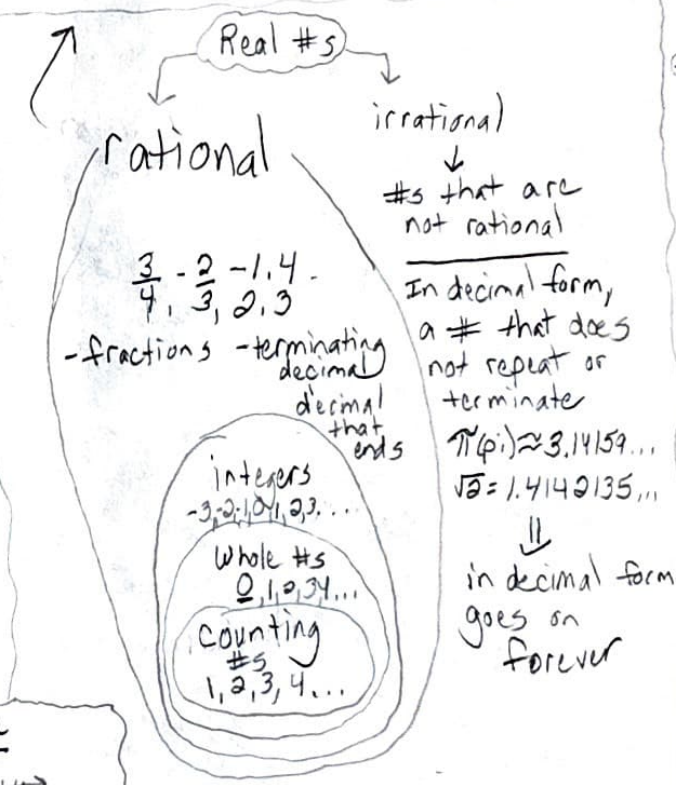
**Temperature**  
 Fahrenheit or Celsius  
 10, 0, -10

**Football**  
 yards lost -  
 yards gained +

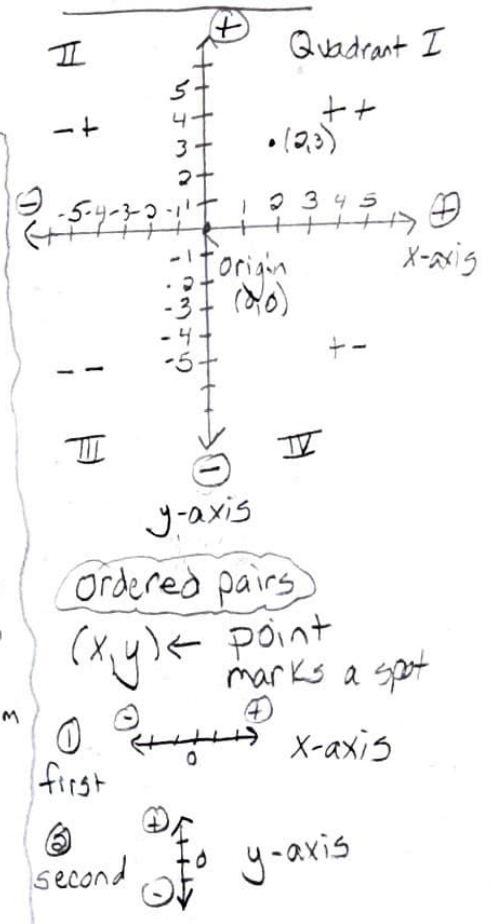
**Coordinate Grid**  
 • maps  
 • air traffic control

Rational Numbers

have a specific point on a # line



Coordinate Plane



Opposites  
 Same distance from 0

Inequalities  
 Comparing + and - numbers

Absolute Value

distance from 0 on a # line

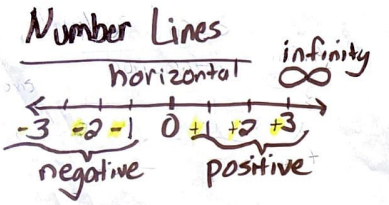
Mathematical Standards and Practices

- 1) We will use precision to find and position rational numbers on a horizontal or vertical number line.
- 2) We will make use of structure when we solve problems by graphing points on the coordinate plane.

What we know about... Inquiry Chart Numbers ... What we want to learn...

# Integers

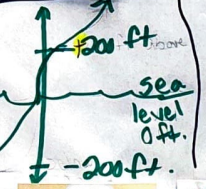
whole #s... -3, -2, -1, 0, 1, 2, 3...



## Real World Uses of Integers

money \$  
I have \$40. !!  
I owe \$40. !!

Altitude



American football



Temperature

Fahrenheit  
Celcius



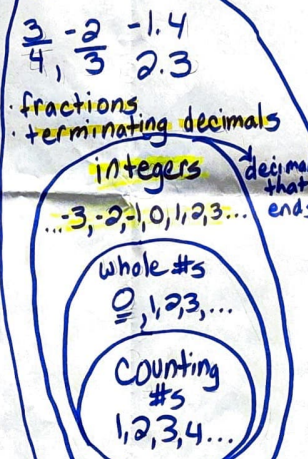
Coordinate grid, maps, traffic control



# Rational Numbers

have a specific point on a # line

## rational

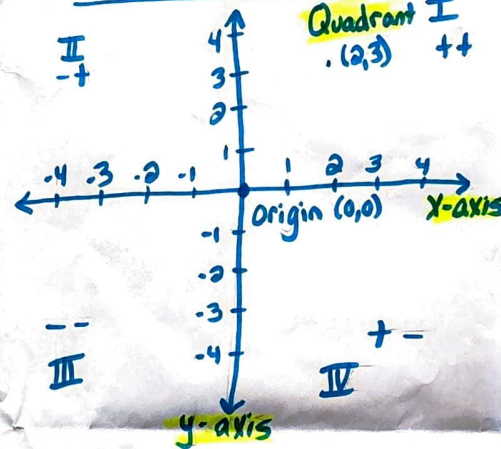


## Irrational

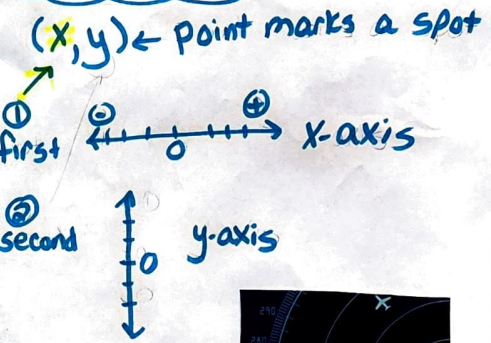
#s that are not rational  
In decimal form, a # that does not repeat or terminate  
 $\pi$  (pi) 3.14159...  
 $\sqrt{2} = 1.4142135...$   
in decimal form goes on forever

have a specific point on a # line

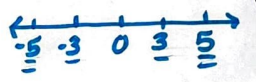
# Coordinate Plane



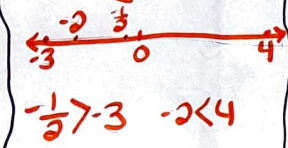
## Ordered pairs



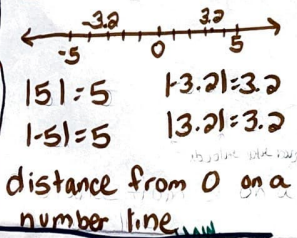
Opposites  
same distance from 0



inequalities  
Comparing + and - #s



Absolute value



## Mathematical Standards and Practices

1) We will use precision to find and position rational numbers on a horizontal or vertical number line.

2) We will make use of structure when we solve problems by graphing points on the coordinate plane.

What We Know about Numbers can get higher as you're counting.

They can be big or small.  
They never stop. They can be infinitely bigger.  $\infty$  = infinity goes on forever  
Numbers are put together for phone numbers and house numbers. 3852 Arvilla St.

## Inquiry Chart

What We want to learn  
Who made the numbers?  
Historians think the Sumerians did the first number system.  
Why do we have to follow math rules?  
If we understand 'math rules', this will help us know why they work.  
How do you solve X and ÷ problems in different ways?  
Are #s used on other planets?  
How are #s used in the real world?  
• cook, money, determining

## Integer Check-In

Name: \_\_\_\_\_

1) Solve.

$$24 + 12 = \underline{\quad}$$

$$16 - 4 = \underline{\quad}$$

$$8 + \underline{\quad} = 10 - 2$$

2) Write  $>$ ,  $<$  or  $=$ .

$$243 \underline{\quad} 378$$

$$\frac{1}{2} \underline{\quad} \frac{3}{4}$$

$$4.5 \underline{\quad} 4.3$$

$$.25 \underline{\quad} \frac{1}{4}$$

In the boxes below, use words, number and/or symbols to show what you know about the vocabulary words.

4) Positive Numbers

4) Negative Numbers

5) Number Lines

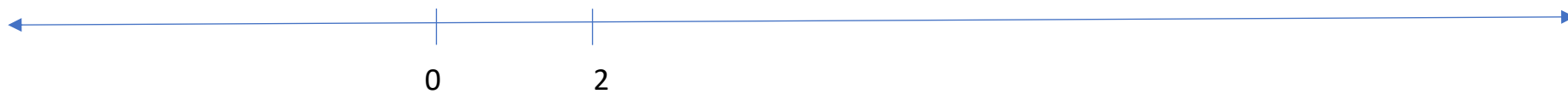
6) Plot these numbers on the number line.

5

4

$1\frac{1}{2}$

-2



7) List two ways positive and negative numbers are used in real-life situations.