

# Unit 1: Rational Numbers

## 6<sup>th</sup> Grade Honors Mathematics

16 Class Meetings

Revised October 2025

### Essential Questions

- How do the intervals on a number line affect the value of the numbers?
- How does the number line help determine the magnitude of the number?
- When is a coordinate system used in real life?

### Enduring Understandings with Unit Goals

**EU1:** The number line can be extended to the left or downward to include negative values. Integers and other rational numbers can be used to represent and model real-world values, including situations with negatives.

- Use positive and negative numbers to represent real-world contexts, including money, temperature, and elevation
- Define and determine opposites
- Find, position, and compare rational numbers on horizontal and vertical number lines.

**EU 2:** Absolute value can be used to determine a number's distance from zero.

- Define and determine absolute value
- Write and interpret inequalities involving absolute value
- Use absolute value to model magnitude and distance in real world situations

**EU 3:** When two perpendicular number lines intersect, they create a four-quadrant coordinate plane. The coordinate plane can be used to describe location in two dimensions, defined by an ordered pair.

- Understand structure of the coordinate plane
- Reflect points across axes
- Calculate vertical and horizontal distances on a coordinate plane

### Standards

#### Common Core State Standards:

- **6.NS.C.5:** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values
- **6.NS.C.6.A:** Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself.
- **6.NS.C.6.C:** Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
- **6.NS.C.7.A:** Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
- **6.NS.C.7.B:** Write, interpret, and explain statements of order for rational numbers in real-world contexts.
- **6.NS.C.7.C:** Understand the absolute value of a rational number as its distance from 0 on the number

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line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.

- **6.NS.C.7.D:** Distinguish comparisons of absolute value from statements about order.
- **6.NS.C.6.B:** Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
- **6.NS.C.8:** Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane.

**ISAAC Vision of the Graduate Competencies**

**Competency 1:** Write effectively for a variety of purposes.

**Competency 2:** Speak to diverse audiences in an accountable manner.

**Competency 3:** Develop the behaviors needed to interact and contribute with others on a team.

**Competency 4:** Analyze and solve problems independently and collaboratively.

**Competency 5:** Be responsible, creative, and empathetic members of the community.

**Unit Content Overview**

**1. Positive and Negative Numbers**

- Extend the number line
- Use positive and negative numbers to describe real-world contexts
- Define opposites
- Find and position integers and rational numbers on horizontal and vertical number lines
- Vocabulary-positive number, negative number, opposites, credit, debit, charge, integer, deposit, withdrawal, elevation

**2. Order and Absolute Value**

- Compare and order integers and rational numbers
- Write and interpret inequalities to compare rational numbers
- Define absolute value
- Use absolute value to model magnitude and distance
- Vocabulary-greater than, less than, inequality, absolute value, equivalent

**4. Coordinate Plane**

- Understand structure of coordinate plane
- Use ordered pairs to name location on coordinate plane
- Reflect points across axes
- Use absolute value to calculate vertical and horizontal distance between points
- Vocabulary-vertical, horizontal, opposite, coordinate plane, quadrant, reflection, ordered pair, origin

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### Interdisciplinary Connection:

- Language Arts – Reading strategies for solving Word Problems; vocabulary
- Humanities:
  - Unit 1: Many Faces, Many Places
- Science –
  - Unit 1: Weather Patterns
  - Unit 2: Earth and Universe
  - Unit 3: Inside the Earth

### Daily Learning Objectives with *TWPS*

#### Students will be able to...

- Create horizontal and vertical number lines using proper intervals to include positive and negative numbers.
  - *TWPS: SBAC-Use the table to solve the problem. Allie buys 2 packages of napkins and 3 packages of forks for a class party. She gives the store clerk \$10.00. What is the total amount of money that Allie should receive back? Explain.*
- Represent real world situations using positive and negative numbers
  - *TWPS: Lily is making a vertical number line to plot the points -4, -2, 3 and 4 for her math project. Her older brother noticed that -4 is closer to zero than -3 on her diagram so he told Lily that he thinks she made a mistake. Using your knowledge of positive and negative integers, do you agree with Lily's brother or do you think Lily's diagram is correct? Support your claim with a CER response and a vertical number line.*
- Generate opposites on a number line
  - *TWPS: A group of friends is measuring the depth of holes they dug in their backyard for a project. The depths (in feet, negative numbers are below ground, positive numbers are above ground for mound of dirt) are: Hole A: -3ft, Hole B: +2ft; Hole C: -5ft; Hole D: +4ft; and Hole E: -1ft. Draw a vertical number line to represent each hole's depth. Which hole is the most extreme? (farthest from ground level). Support your claim with evidence and reasoning.*
- Compare and order integers and rational numbers by plotting them on a number line using appropriate intervals (Thermometers)\*\*
  - *TWPS: My age is a multiple of 6. Three years ago my age was a multiple of 5. Next year my age will be a multiple of 7. I am less than 100 years old. How old am I now? Write a CER response.*
  - *TWPS: A group of friends is tracking the temperature (in °C) at the same time each day for a week. The temperatures are Monday: -2°C, Tuesday: +3°C, Wednesday: 0°C, Thursday: -4°C and Friday: +1°C. Draw a vertical number line and plot the temperatures. Make a claim about which day was the coldest and which day was the warmest. Support your claims with evidence from the number*

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*line and explain your reasoning.*

- Construct and interpret inequalities to compare rational numbers
  - TWPS: Would you rather deposit \$100 into an account with a -\$3 balance or deposit \$2 into an account with a \$90 balance? Explain using a Claim/Evidence/Reason response.
- Distinguish absolute value of a number and use it to find distance on a number line.
  - TWPS: Plot the following rational numbers on the number line below:  $-3/2$ ,  $-1\frac{1}{4}$ ,  $5/4$ . Write two different inequalities that compare pairs of these numbers. Write a claim, support it with evidence and explain your reasoning about one of the inequalities you created.
- Construct a coordinate plane with appropriate components
  - TWPS: Use the numbers from the box to create three true mathematical statements. You can only use each number once. Then write a CER response based on one of the statements you created. The numbers are  $-5$ ,  $1-11$ ,  $1-51$ ,  $4$ ,  $181$ ,  $9$ ,  $5$ ,  $-2$ ,  $131$ .  $\underline{\hspace{1cm}} > \underline{\hspace{1cm}}$ ,  $\underline{\hspace{1cm}} < \underline{\hspace{1cm}}$ ,  $\underline{\hspace{1cm}} = \underline{\hspace{1cm}}$
- Demonstrate and describe the locations on the coordinate plane using ordered pairs
  - TWPS: A scuba diver is exploring the ocean. The table shows the diver's depths at different times of the day. Put the times in order from shallowest depth to the deepest depth using the absolute value of the depths. Write a CER about why you ordered the depths the way you did.
- Evaluate and explain the impact of reflections on the signs of ordered pairs
  - TWPS: -SBAC- The temperature was  $-2^{\circ}\text{F}$  at midnight. The absolute value of the temperature at 3:00AM was less than the absolute value of the temperature at midnight. Select all of the temperatures that could have been the temperature at 3:00AM. ( $-3^{\circ}\text{F}$ ,  $-1^{\circ}\text{F}$ ,  $-0.5^{\circ}\text{F}$ ,  $0^{\circ}\text{F}$ ,  $1.5^{\circ}\text{F}$ , or  $2.5^{\circ}\text{F}$ ) Write a CER response about the temperatures that could have been the temperature at 3:00AM.
- Calculate the vertical and horizontal distances on a coordinate plane using absolute value
  - TWPS: SBAC- The ocean floor at a particular dive site is  $-20$  feet. A diver is located at  $5$  ft below sea level. The captain of a boat is located at an altitude of  $15$  feet directly above the diver. For numbers 1a- 1d write true or false for each statement. Then choose one of the statements to write a CER response about why it is either true or false. 1a. The distance from the captain to the diver is greater than the distance from the top of the water to the ocean floor. 1b. The distance from the captain to the top of the water is the same as the distance from the diver to the ocean floor. 1c. When the diver swims to  $-10$  ft, the diver will be the same distance below the top of the water as the captain is above the top of the water. 1d. When the diver swims to  $-10$ ft, the diver's distance to the ocean floor will be equal to the diver's distance to the top of the water.

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**Instructional Strategies/Differentiated Instruction**

- Whole group instruction
- Guided notes
- Accountable Talk
- TWPS
- Student-led instruction/discussions
- Independent problem-solving
- Collaborative problem-solving
- Graphic Organizer
- Cross-curricular problem solving (independent and collaborative)
- Homework
- Word walls with visuals
- Small group instruction
- Manipulatives
- Interactive Notebook
- Highlighted directions
- CER (Claim, Evidence, Reasoning)

**EL DIFFERENTIATED INSTRUCTION:**

- Word Walls with visuals
- TWPS (Think, Write, Pair, Share)
- Pre-reading strategies
- Culturally responsive teaching
- Explicit Modeling
- Key Vocabulary
- Graphic Organizers
- Strategic Grouping
- Non-verbal Assessments
- Modified classwork and homework

**Assessments**

**FORMATIVE ASSESSMENTS:**

- Warm-ups
- TWPS
- CER
- Whiteboards
- Mid-class check-ins (Fist of 5; Thumbs up/mid/down)
- Exit Slips
- Accountable Talk Discussions
- Student-led instruction

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- Classwork
- Homework

### **SUMMATIVE ASSESSMENTS:**

- Pear Assessment Quiz - EU 1
- Pear Assessment Quiz – EU 2
- Performance Task- “Water Crisis in Haiti”
- Pear Assessment Unit 1 Summative Assessment

### **Unit Task**

**Unit Task Name:** “Water Crisis in Haiti”

**Description:** In this task, students will use their knowledge of the integers (EU1), coordinate plane and graphing to complete a plan for visiting effected cities on a coordinate map of Haiti, given specific instructions throughout the activity. They will plot and label the cities on the coordinate plane (EU3), identify coordinates, reflect points over the x and y axes, and calculate the vertical and horizontal distances on a coordinate plane using absolute value (EU 2).

**Evaluation:** Unit 1 Summative Assessment Rubric

### **Unit Resources**

- Pear Assessment
- Engage NY
- Math In Focus
- Math Antics
- State Common Core Standards Transition Tasks
- Match Fishtank
- Worksheets
- Individual White boards
- Interactive notebook
- Laptops
- SBAC Prep Online
- 2 Truths & One Lie
- Education.com
- Commoncoresheets.com
- Maneuvering the Middle