Unit 3 Lesson 10: A New Kind of Number

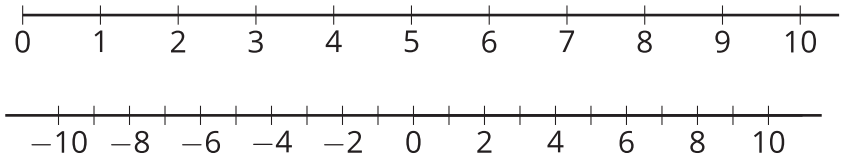
1 Numbers Are Inventions (Warm up)

Student Task Statement

Jada was helping her cousin with his math homework. He was supposed to solve the equation $8 + x = 5$. He said, "If I subtract 8 from both sides, I get $x = 5 - 8$. This doesn't make sense. You can't subtract a bigger number from a smaller number. If I have 5 grapes, I can't eat 8 of them!"

What do you think Jada could say to her cousin to help him understand why $5 - 8$ actually does make sense?

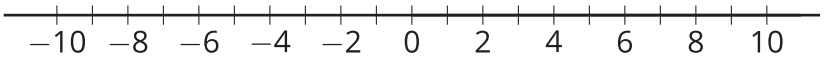
Activity Synthesis



2 The Square Root of Negative One

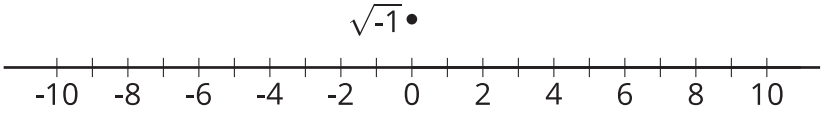
Student Task Statement

Numbers on the number line are often called **real numbers**.



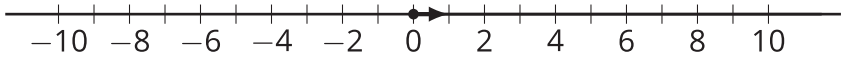
1. The equation $x^2 = 9$ has 2 real solutions. How can you see this on the graph of $y = x^2$? Draw points on this real number line to represent these 2 solutions.
2. How many real solutions does $x^2 = 0$ have? Explain how you can see this on the graph of $y = x^2$. Draw the solution(s) on a real number line.
3. How many real solutions does $x^2 = -1$ have? Explain how you can see this on the graph of $y = x^2$. Draw the solution(s) on a real number line.

Activity Synthesis



3 Imaginary Numbers

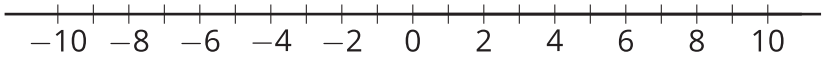
Images for Launch



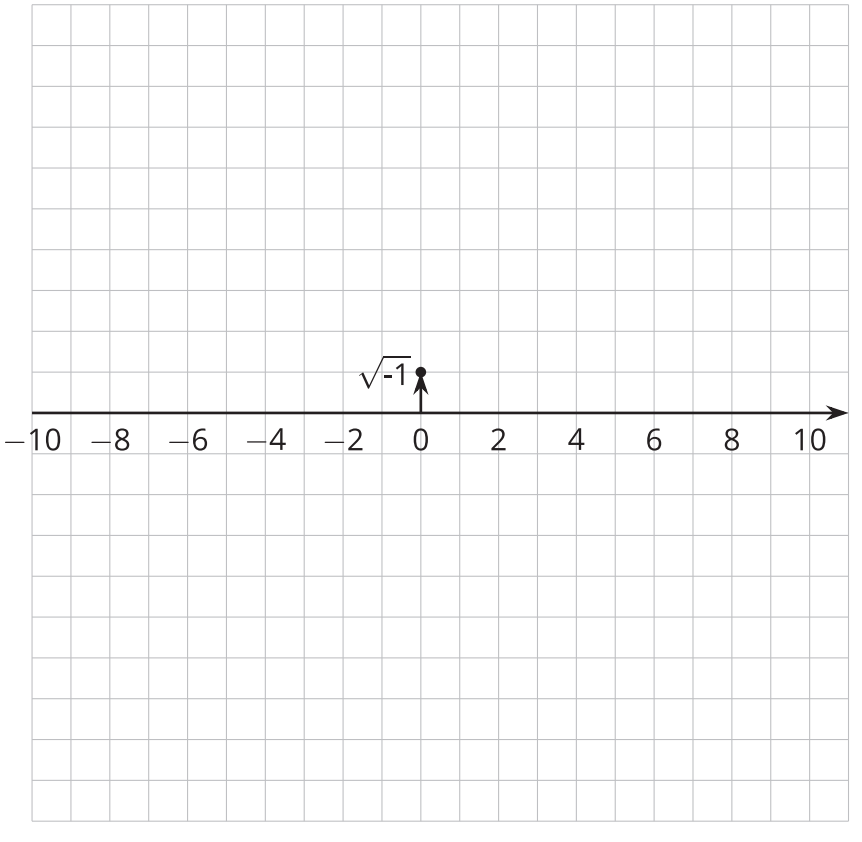
Student Task Statement

1. On the real number line:
   a. Draw an arrow starting at 0 that represents 3.

   b. Draw an arrow starting at 0 that represents -5.



2. This diagram shows an arrow that represents $\sqrt{-1}$.



   a. Draw an arrow starting at 0 that represents $3\sqrt{-1}$.

   b. Draw an arrow starting at 0 that represents $-\sqrt{-1}$.

   c. Draw an arrow starting at 0 that represents $-5\sqrt{-1}$.