Rational Numbers on the Number Line

Maths · CBSE Class 9 · Number Systems · PrayogX short notes

▸ **Video explanation:** Watch the PrayogX reel on Instagram

In one line: to place p/q, divide each unit into **q equal parts** (denominator) and **count p parts** from 0 (numerator): right for positive, left for negative.

Steps to locate p/q

1. Draw the number line and mark 0, 1, 2, … (and −1, −2, … if needed).
2. Divide each unit (0 to 1, 1 to 2, …) into q equal parts, where q is the denominator.
3. Starting at 0, count p parts: to the right if p/q is positive, to the left if it is negative.
4. The point where you stop is p/q.

Rule to remember

Denominator = how many equal parts in each unit. Numerator = how many parts to count.

Worked examples

Number	Parts per unit	Count from 0	Where it lands
3/4	4	3 parts right	Between 0 and 1, just before 1
5/3	3	5 parts right	Between 1 and 2 (5/3 = 1⅔)
−1/2	2	1 part left	Exactly halfway between 0 and −1

Key ideas

- Equivalent fractions land on the same point: 1/2, 2/4 and 3/6 are one point.
- An improper fraction like 7/4 = 1¾ lies beyond 1: write it as a mixed number to see between which integers it falls.
- **Density:** between any two rational numbers there is always another rational number, for example their average (a + b)/2. So there are infinitely many rationals between any two of

them.

Example of density

Between 1/2 and 3/4: average = (1/2 + 3/4)/2 = **5/8**. Between 1/2 and 5/8: **9/16**. And so on, forever.

Common mistakes

- Dividing the whole visible line instead of each unit into q parts.
- Counting tick marks instead of parts (count the gaps, not the lines).
- Putting −1/2 to the right of 0. Negative numbers go to the left.

Quick check

1. Between which two integers does 11/4 lie? *11/4 = 2¾, so between 2 and 3.*
2. Find a rational number between 1/3 and 1/2. *(1/3 + 1/2)/2 = 5/12.*
3. How many parts would you cut each unit into for −2/5? *5, then count 2 parts to the left.*

Takeaway

> **Denominator tells how many parts to cut; numerator tells how many to count.**

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