



The world of numbers

Lecture - 02

CLASS-9TH

MATHS

Ritik Sir



Topics To Be Covered

- ① Plotting rational numbers on the number line
- ② Density of $\mathbb{Q}$.

The world of numbers

Lecture - 2

Distributive property

$$a(b+c) =$$

$$axb + axc$$

$$\underline{2}(3+7) = 6 + 14 = \underline{20}$$

QUESTIONS



Simplify the following using the distributive property:

$$\frac{7}{9} \left(\frac{6}{7} - \frac{3}{4} \right)$$

$$\cancel{\frac{7}{9}} \times \frac{2}{\cancel{3}} - \cancel{\frac{7}{9}} \times \frac{2}{\cancel{6}}$$

$$\frac{2}{3} - \frac{1}{2}$$

$$\frac{8-3}{6} = \frac{5}{6}$$

QUESTIONS



✓ Show that: $\left(\frac{1}{2} + \frac{3}{4}\right) \times \frac{8}{3} = \frac{1}{2} \times \frac{8}{3} + \frac{3}{4} \times \frac{8}{3}$

$\therefore L.H.S = R.H.S$

Hence proved.

L.H.S

$$\left(\frac{1}{2} + \frac{3}{4}\right) \times \frac{8}{3}$$

$$\left(\frac{2+3}{4}\right) \times \frac{8}{3}$$

$$\frac{50}{12} = \frac{20}{6} = \boxed{\frac{10}{3}}$$

R.H.S

$$\frac{1}{2} \times \frac{8}{3} + \frac{3}{4} \times \frac{8}{3}$$

$$\frac{1}{2} + \frac{2}{1}$$

$$\frac{4+8}{3} = \boxed{\frac{10}{3}}$$

$$\textcircled{1} \quad 2x + \frac{5}{3} = \frac{9}{2}$$

$$2x = \frac{9}{2} - \frac{5}{3}$$

$$2x = \frac{27-10}{6}$$

$$x = \frac{17}{6 \times 2}$$

$$\boxed{x = \frac{17}{12}}$$

$$\textcircled{1} \quad -3x + \frac{2}{3} = x + \frac{4}{9}$$

$$-3x - x = \frac{4}{9} - \frac{2}{3}$$

$$-4x = \frac{4-6}{9}$$

$$-4x = -\frac{2}{9}$$

$$x = \frac{-2}{9 \times -4}$$

$$\boxed{x = \frac{1}{18}}$$

$$\begin{array}{r} 3 \overline{) 3.9} \\ \underline{3} \\ 0 \\ \underline{0} \\ 0 \\ \underline{0} \\ 0 \end{array}$$

QUESTIONS

#Q1

Find the rational number x such that:

$$\frac{5}{6} \left(x + \frac{3}{5} \right) = \frac{5}{6}x + \frac{1}{2}$$

$$\frac{5}{6} \left(x + \frac{3}{5} \right) = \frac{5}{6}x + \frac{1}{2}$$

$$\frac{5x}{6} + \frac{\cancel{15}}{\cancel{30}2} = \frac{5x}{6} + \frac{1}{2}$$

$$\frac{5x}{6} + \frac{1}{2} = \frac{5x}{6} + \frac{1}{2}$$

$x = \text{All Rational no.s.}$

Q $x + 2 = x + 2$

$x = \text{All rational no.s.}$

RATIONAL NUMBERS ON NUMBER LINE

$$N > D$$

$$\frac{2}{2} < \frac{3}{2}$$

$$1 < \frac{2}{2}$$

$$N = D$$

$$\frac{5}{5} = \frac{1}{1}$$

$$\frac{4}{4} = \frac{1}{1}$$

$$N < D$$

$$\frac{2}{2} < \frac{3}{2}$$

$$\frac{2}{4} < \frac{3}{2}$$

LEVEL 1: PROPER FRACTIONS (NUMERATOR < DENOMINATOR)



QUESTIONS

Represent $\frac{1}{2}$ on number line.

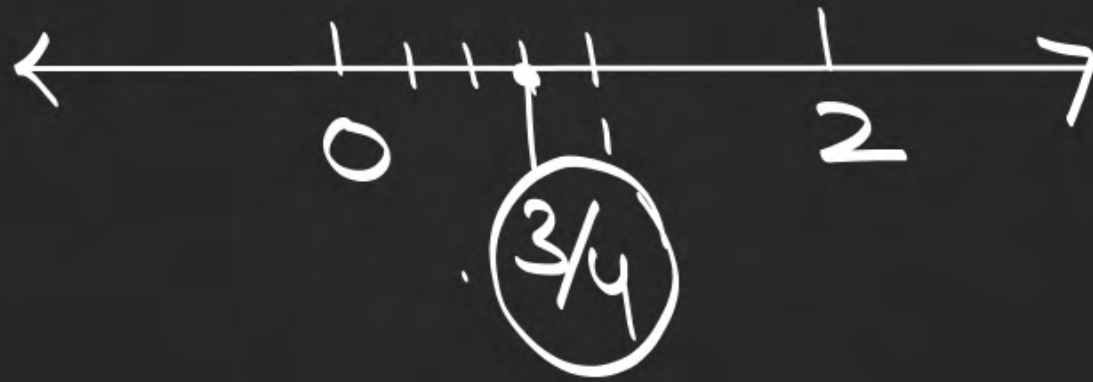
$D > N$



QUESTIONS

Represent $\frac{3}{4}$ on number line.

$D > N$



QUESTIONS

Represent $\frac{5}{8}$ on number line.

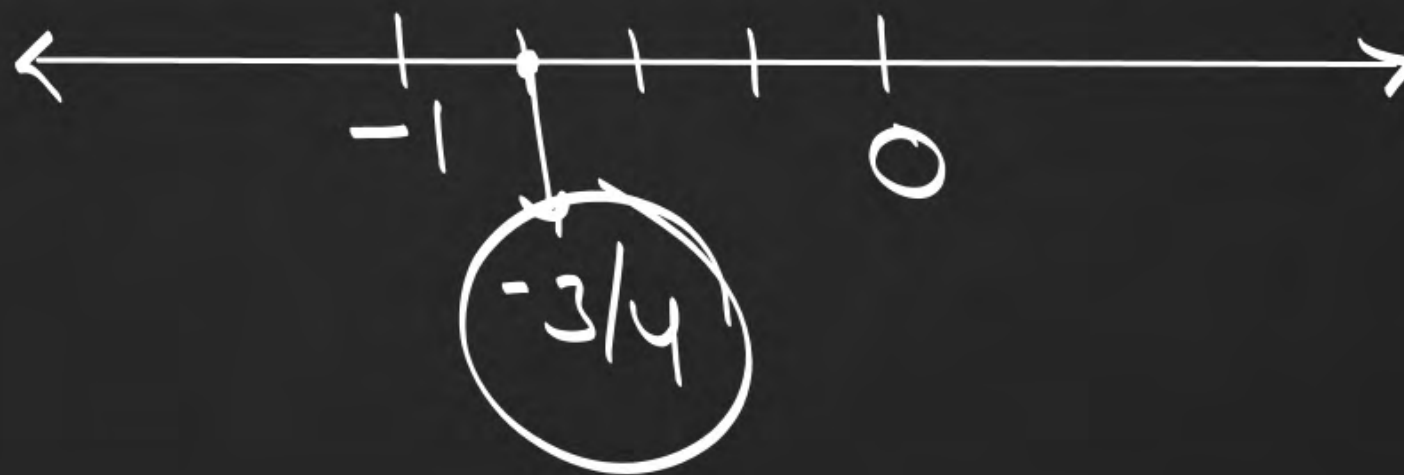
$D > N$



QUESTIONS

Represent $-\frac{3}{4}$ on number line.

D > N



LEVEL 2: IMPROPER FRACTIONS (NUMERATOR $>$ DENOMINATOR)



QUESTIONS

Represent $\frac{5}{4}$ on number line.

$N > D$

$1\frac{1}{4}$

$5 \overline{) 15} \begin{array}{r} 3 \\ \underline{15} \\ 0 \end{array}$

$\frac{5}{4} = 1\frac{1}{4}$



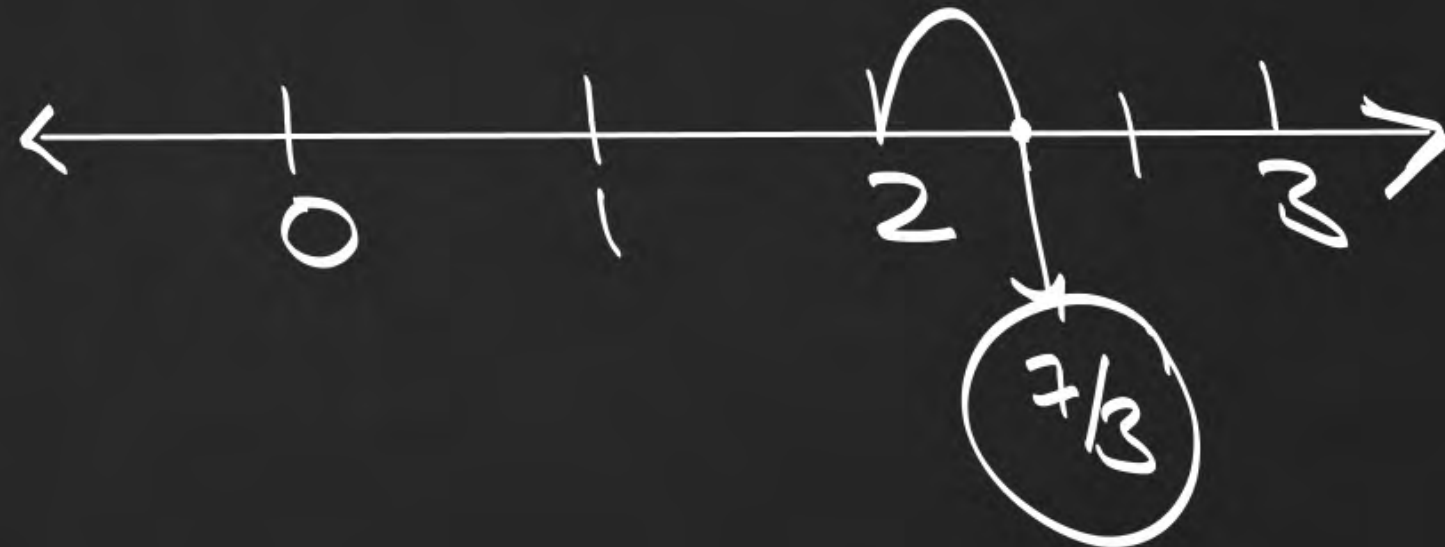
QUESTIONS

Represent $\frac{7}{3}$ on number line.

$N > D$

$$3 \overline{) 7} \begin{array}{r} 2 \\ 6 \\ \hline 1 \end{array}$$

$$2 \frac{1}{3}$$

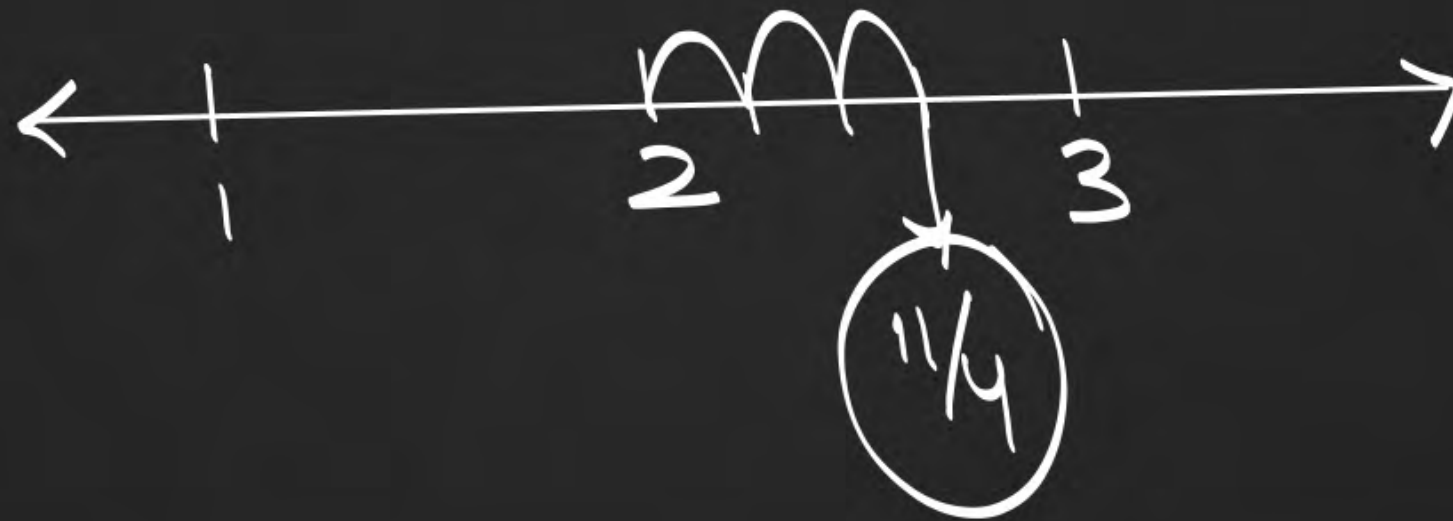


QUESTIONS

Represent $\frac{11}{4}$ on number line.

$N > D$

$$2\frac{3}{4}$$



QUESTIONS

Represent $3\frac{1}{5}$ on number line.

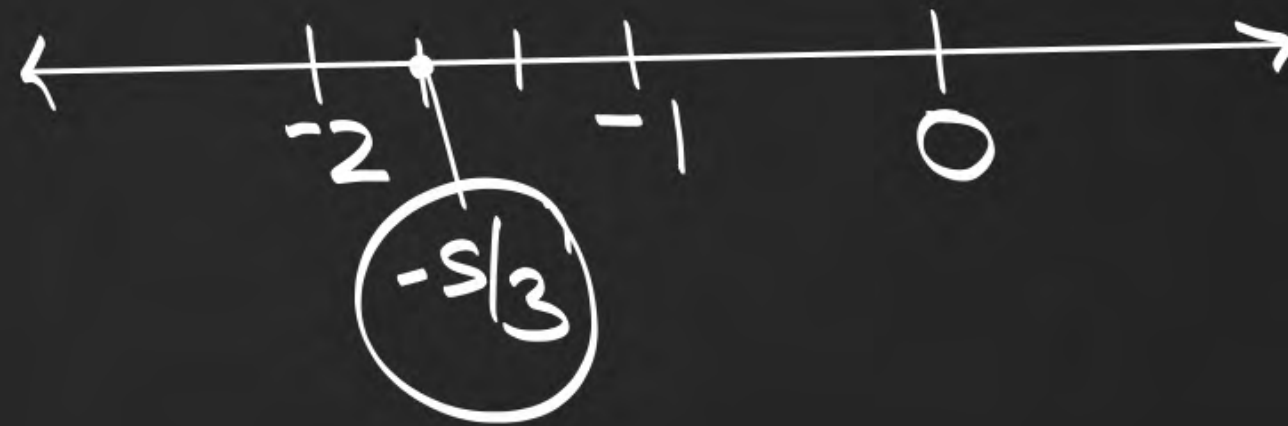


QUESTIONS

Represent $-\frac{5}{3}$ on number line.

N>D

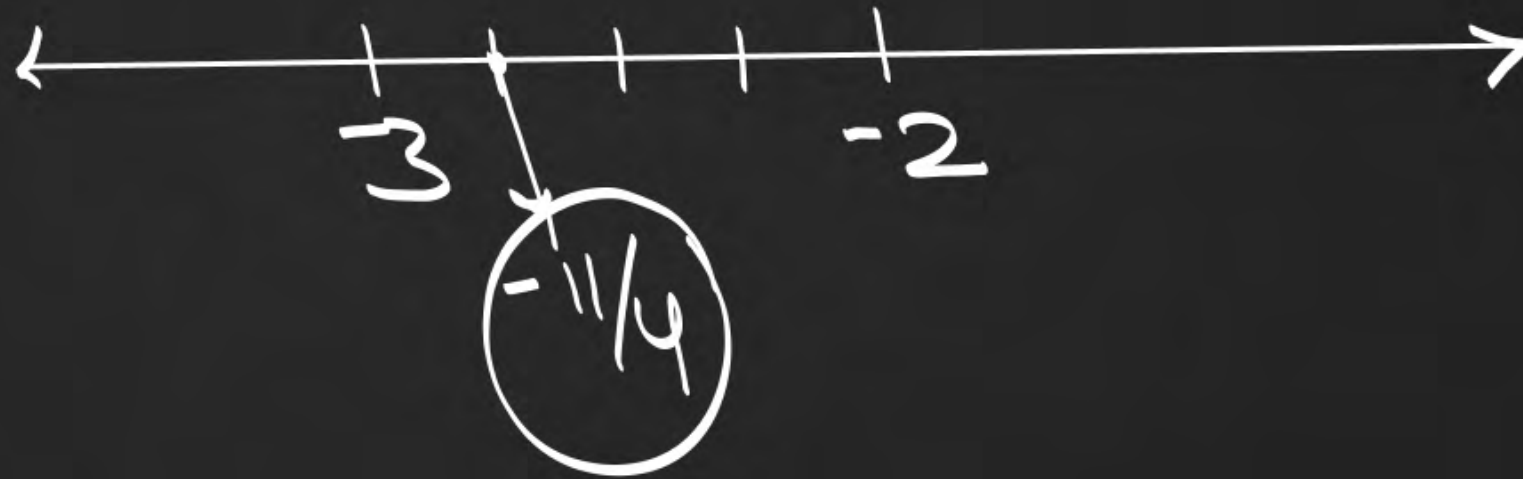
$$-1\frac{2}{3}$$



QUESTIONS

Represent $-\frac{11}{4}$ on number line.

$$-2\frac{3}{4}$$



QUESTIONS

Arrange and then represent on the same number line:

$$-\frac{3}{2}, \frac{1}{2}, -\frac{1}{4}, \frac{5}{4}$$

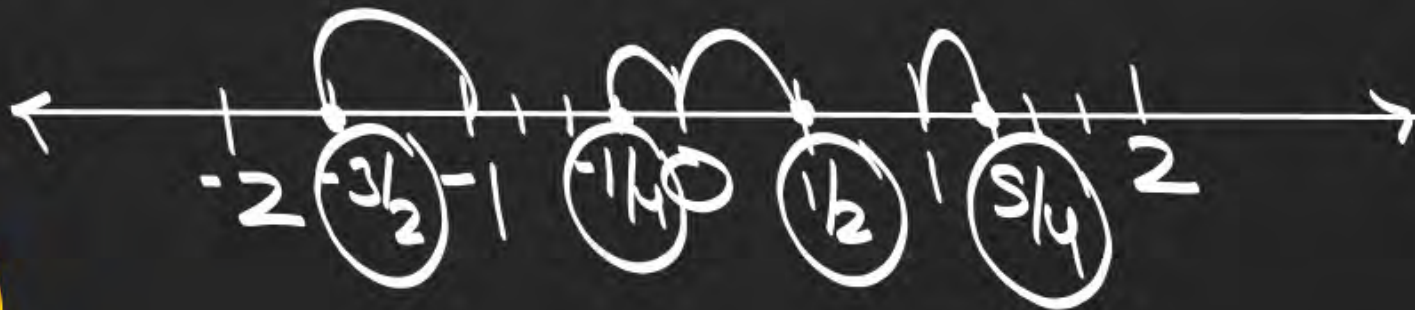
$$-\frac{6}{4}, \frac{2}{4}, -\frac{1}{4}, \frac{5}{4}$$

$$-\frac{6}{4} < -\frac{1}{4} < \frac{2}{4} < \frac{5}{4}$$

$$-\frac{3}{2} < -\frac{1}{4} < \frac{1}{2} < \frac{5}{4}$$

$$-\frac{1}{2}$$

$$-\frac{1}{4}$$



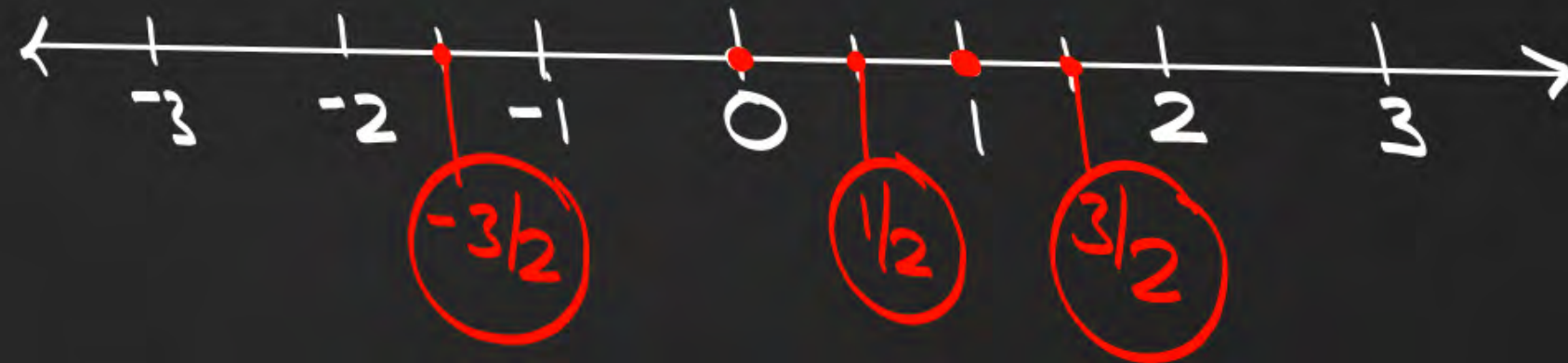
QUESTIONS

Represent on the same number line:

$$-\frac{3}{2}, 0, \frac{1}{2}, 1, \frac{3}{2}$$

$$-1\frac{1}{2}$$

$$1\frac{1}{2}$$



QUESTIONS

Represent $\frac{2}{3}, -\frac{5}{4}, 1\frac{1}{2}$ on a single number line.

#GPK

ABSOLUTE VALUE

Distance from zero.

never -ve

$$|-s| = s$$

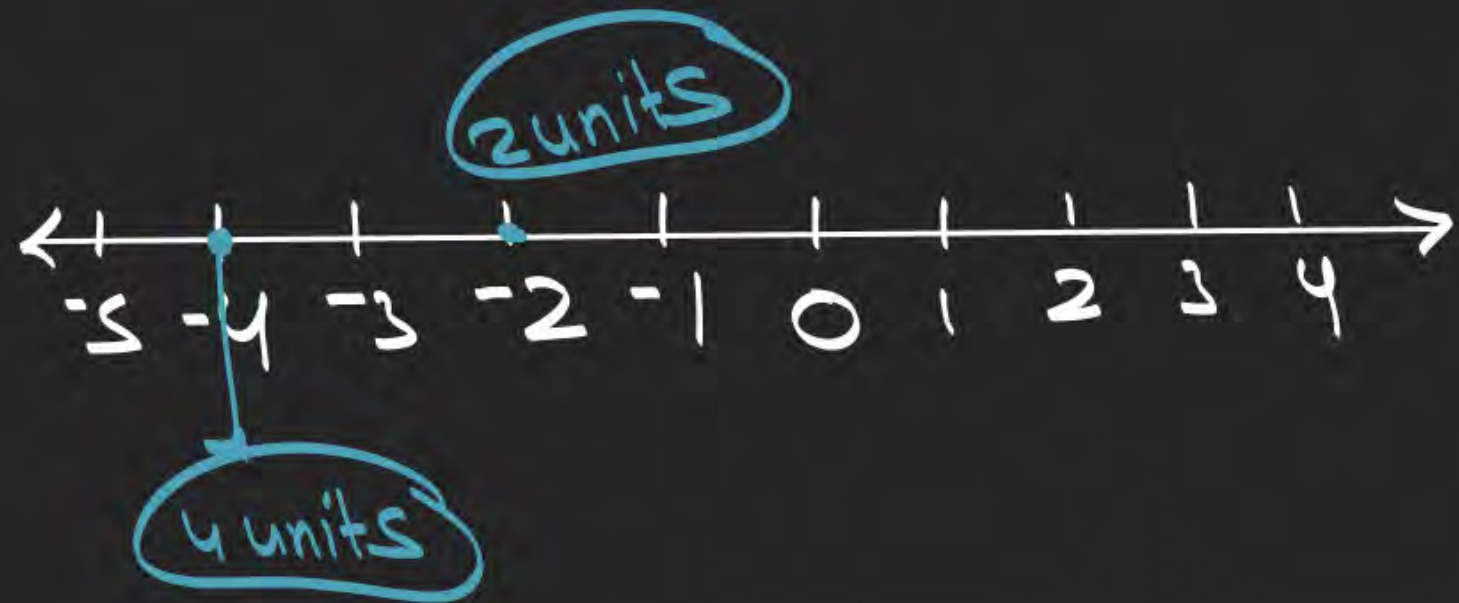
$$|0| = 0$$

$$|-6| = 6$$

$$|-7| = 7$$

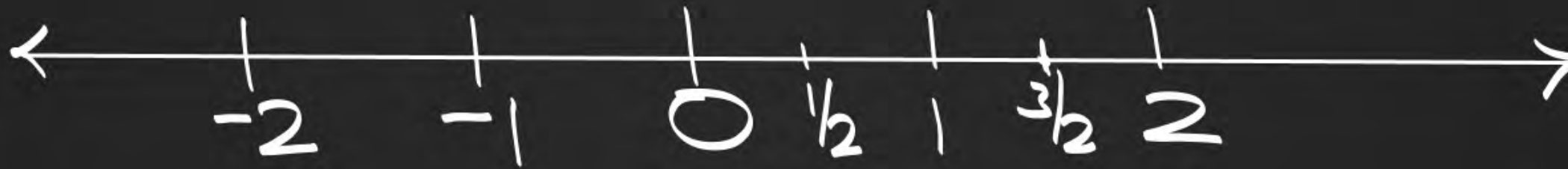
$$|8| = 8$$

$$|2| = 2$$



DENSITY OF RATIONAL NUMBERS

Between any two distinct rational numbers, there exist infinitely many rational numbers.



Rational no's b/w any two

Average
method

equiva
Ration
no.
method.

QUESTIONS



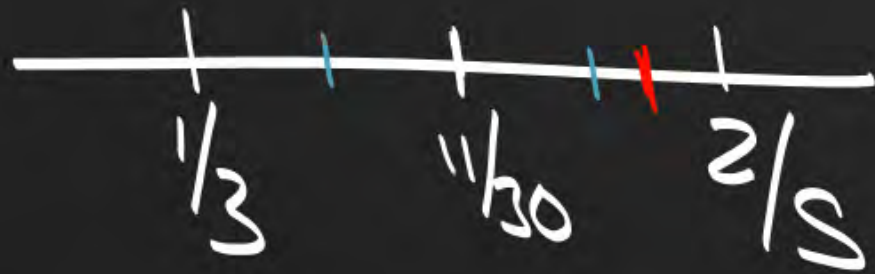
Find one rational number between: 1 and 3.

$$\frac{1+3}{2} = 2 = \textcircled{2}$$

QUESTIONS

Find one rational number between: $\frac{1}{3}$ and $\frac{2}{5}$.

$$\frac{\frac{1}{3} + \frac{2}{5}}{2} = \frac{\frac{5+6}{15}}{2} = \frac{\frac{11}{15}}{2} = \frac{11}{30}$$



QUESTIONS

Find one rational number between: $-\frac{1}{2}$ and $\frac{1}{4}$.

$$\begin{aligned} \frac{-\frac{1}{2} + -\frac{1}{8}}{2} &= \frac{-\frac{4}{8} - \frac{1}{8}}{2} = \frac{-\frac{5}{8}}{2} = -\frac{5}{16} \\ \frac{-\frac{1}{2} + \frac{1}{4}}{2} &= \frac{-\frac{2}{4} + \frac{1}{4}}{2} = \frac{-\frac{1}{4}}{2} = -\frac{1}{8} \\ \frac{-\frac{1}{8} + \frac{1}{4}}{2} &= \frac{-\frac{1}{8} + \frac{2}{8}}{2} = \frac{\frac{1}{8}}{2} = \frac{1}{16} \end{aligned}$$


Thank You !

- *Work Hard.*
- *Dream big.*
- *Never give up.*