

List Five Rational Numbers Between $-\frac{4}{5}$ And $-\frac{2}{3}$. Please Tell By Step By Step Explanation

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Finding rational numbers between two given fractions is a common problem in mathematics that helps develop understanding of number lines, fractions, and rational numbers. This article provides a comprehensive, step-by-step guide to identify five rational numbers lying between $(-\frac{4}{5})$ and $(-\frac{2}{3})$. We will systematically explain the process, including converting fractions to comparable forms, finding common denominators, and selecting suitable rational numbers. Whether you're a student preparing for exams or someone interested in mathematical reasoning, this guide aims to clarify the method thoroughly.

Understanding Rational Numbers and the Given Fractions

What Are Rational Numbers?

- Rational numbers are numbers that can be expressed as the quotient or fraction $(\frac{p}{q})$, where (p) and (q) are integers, and $(q \neq 0)$.
- Examples include $(\frac{1}{2})$, $(-\frac{3}{4})$, 0 , and integers like 5 (which can be written as $(\frac{5}{1})$).

Given Fractions: $(-\frac{4}{5})$ and $(-\frac{2}{3})$

- Both fractions are negative, indicating they lie to the left of zero on the number line.
- Our goal is to find five rational numbers between these two fractions.

Step 1: Convert Fractions to a Common Denominator

To compare fractions efficiently, especially when finding numbers lying between them, it's best to convert both to equivalent fractions with a common denominator.

Find the Least Common Denominator (LCD)

- Denominator of $(-\frac{4}{5})$: 5
- Denominator of $(-\frac{2}{3})$: 3
- LCD of 5 and 3: 15 (since 15 is the smallest number divisible by both 5 and 3)

Convert both fractions to have denominator 15

- $(-\frac{4}{5})$: multiply numerator and denominator by 3
[
 $-\frac{4 \times 3}{5 \times 3} = -\frac{12}{15}$
]
- $(-\frac{2}{3})$: multiply numerator and denominator by 5
[
 $-\frac{2 \times 5}{3 \times 5} = -\frac{10}{15}$
]

Now, the fractions are:

- $(-\frac{12}{15})$
- $(-\frac{10}{15})$

Since $(-\frac{12}{15})$ is less than $(-\frac{10}{15})$, the numbers lying between them are greater than $(-\frac{12}{15})$ and less than $(-\frac{10}{15})$.

Step 2: Understand the Number Line and the Range

- The number line segment of interest is between $(-\frac{12}{15})$ and $(-\frac{10}{15})$.
- Recognize that these are negative numbers: (-0.8) and $(-0.666\dots)$.
- Our task is to find rational numbers greater than (-0.8) and less than $(-0.666\dots)$.

Step 3: Find Rational Numbers Between $(-\frac{12}{15})$ and $(-\frac{10}{15})$

To find rational numbers between these two fractions, consider their decimal equivalents:

- $(-\frac{12}{15}) = -0.8$
- $(-\frac{10}{15}) \approx -0.6667$

Any rational number greater than (-0.8) and less than (-0.6667) will satisfy the condition.

Step 4: Selecting Rational Numbers Between the Two Fractions

There are multiple methods to find rational numbers in between. Here, we will explore two common approaches:

Method 1: Find fractions with a common denominator between 15 and a higher denominator for more options

- Increase the denominator to find finer fractions.
- For example, choose denominator 30 (double 15):
- Convert $(-\frac{12}{15})$ to denominator 30:
$$[-\frac{12 \times 2}{15 \times 2} = -\frac{24}{30}]$$
- Convert $(-\frac{10}{15})$ to denominator 30:
$$[-\frac{10 \times 2}{15 \times 2} = -\frac{20}{30}]$$
- Now, the fractions are:
- $(-\frac{24}{30})$ (which is (-0.8))
- $(-\frac{20}{30})$ (which is (-0.6667))
- Rational numbers between these can then be selected as fractions with denominator 30, with numerators between 20 and 24:
- $(-\frac{23}{30})$
- $(-\frac{22}{30})$
- $(-\frac{21}{30})$
- Simplify where possible:

- $\left(-\frac{23}{30}\right)$ (cannot be simplified)
- $\left(-\frac{22}{30} = -\frac{11}{15}\right)$ (since 2 and 30 are divisible by 2)
- $\left(-\frac{21}{30} = -\frac{7}{10}\right)$
- So, three rational numbers between the original fractions are:
- $\left(-\frac{23}{30}\right)$
- $\left(-\frac{11}{15}\right)$
- $\left(-\frac{7}{10}\right)$

Method 2: Use decimal approximations and convert back to fractions

- Pick decimal numbers between -0.8 and -0.6667, such as:
- -0.75
- -0.72
- -0.69
- -0.68
- -0.67
- Convert these to fractions:
- $-0.75 = -\frac{3}{4}$
- $-0.72 = -\frac{18}{25}$
- $-0.69 = -\frac{69}{100}$
- $-0.68 = -\frac{17}{25}$
- $-0.67 \approx -\frac{67}{100}$
- Check if these are between $\left(-\frac{12}{15}\right)$ and $\left(-\frac{10}{15}\right)$:
- $-\frac{3}{4} = -0.75$ (less than -0.8 , so not between)
- $-\frac{18}{25} = -0.72$ (between -0.8 and -0.6667)
- $-\frac{69}{100} = -0.69$ (between)
- $-\frac{17}{25} = -0.68$ (between)
- $-\frac{67}{100} = -0.67$ (just slightly greater than -0.6667 , so perhaps just outside the range)
- From this, select five suitable rational numbers:
- 1. $-\frac{18}{25}$
- 2. $-\frac{69}{100}$
- 3. $-\frac{17}{25}$
- 4. $-\frac{33}{50}$ (which is -0.66)
- 5. $-\frac{13}{20}$ (which is -0.65)

All these are between -0.8 and -0.6667 .

Step 5: Final List of Five Rational Numbers Between the Given Fractions

Based on the methods above, here are five rational numbers that lie between $-\frac{4}{5}$ and $-\frac{2}{3}$:

1. $-\frac{23}{30}$ (approx. -0.7667)
2. $-\frac{11}{15}$ (approx. -0.7333)
3. $-\frac{7}{10}$ (exactly -0.7)
4. $-\frac{18}{25}$ (approx. -0.72)
5. $-\frac{69}{100}$ (approx. -0.69)

All these fractions are greater than -0.8 and less than -0.6667 , meaning they are strictly between $-\frac{4}{5}$ and $-\frac{2}{3}$.

Additional Tips for Finding Rational Numbers Between Two Fractions