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# Class 8
# Rational Numbers



## Choose correct answer(s) from the given choices

**(1)** Which of the following statements is true for a rational number $\frac{a}{b}$ .

**a.** The numerator *a* can be a decimal number.

**b.** The numerator *a* cannot be a prime number.

**c.** The denominator *b* cannot be 1.

**d.** The denominator *b* cannot be 0.

**(2)** Reduce the rational number $\frac{12}{9}$ to the lowest form.

**a.** $\frac{8}{6}$

**b.** $\frac{9}{12}$

**c.** $\frac{4}{3}$

**d.** $\frac{4}{9}$

**(3)** A drum full of rice weighs $\frac{275}{7}$ kg. If the empty drum weighs $\frac{46}{6}$ kg, find the weight of rice in the drum.

**a.** $\frac{667}{22}$

**b.** $\frac{666}{22}$

**c.** $\frac{664}{21}$

**d.** $\frac{665}{21}$

**(4)** $\frac{6}{0}$ is _____.

**a.** a negative rational number

**b.** a positive rational number

**c.** either positive or negative rational number

**d.** not a rational number

## Fill in the blanks

**(5)** $\frac{1}{10}$ of $\frac{1}{6}$ of 480 is _____.

## Answer the questions

**(6)** Out of the three rational numbers, $\frac{-1}{9}$ , $\frac{-1}{14}$ and $\frac{1}{-12}$ , which is smaller ?

**(7)** From a rope $12\ m$ long, two pieces of lengths $\frac{9}{5}\ m$ and $\frac{17}{6}\ m$ are cut off. What is the length of the remaining rope?

**(8)** Find the 6 rational numbers between $\frac{7}{13}$ and $\frac{-5}{11}$.

**(9)** Find:
$\frac{2}{3} + 0$

**(10)** Sneha is traveling in a train and the train enters a tunnel. She notices that the train, which was traveling at the speed of 54 km per hour, crosses the tunnel in 4 minutes and 6 seconds. What is the length of the tunnel?

**(1)** **d.** The denominator *b* cannot be 0.

**Step 1**

If we look at the question carefully, we notice that the given rational number is $\frac{a}{b}$ .

**Step 2**

**Definition of a rational number :**

Rational numbers are terminating or recurring decimal numbers written in the form of fraction $\frac{p}{q}$ , in which *'p'* and *'q'* are integers and the denominator 'q' not equal to zero.

Here, the denominator is *b*.

According to the definition, the denominator *b* cannot be zero.

**Step 3**

Hence, option **d** is the correct answer.

**(2)** **c.** $\frac{4}{3}$

**Step 1**

We will find the HCF of the numerator & the denominator.

HCF(12, 9) = 3

**Step 2**

Now, divide both the numerator and the denominator by 3.

$$\frac{12 \div 3}{9 \div 3} = \frac{4}{3}$$

**Step 3**

Hence, the lowest form of the rational number $\frac{12}{9}$ is $\frac{4}{3}$ .

**Step 4**

Hence, option **d** is the correct answer.

**(3)** **c.** $\frac{664}{21}$

**Step 1**

To find the weight of rice in the drum, we will simply subtract the weight of the empty drum from the weight of the drum full of rice.

**Step 2**

The weight of the drum full of rice = $\frac{275}{7}$ kg

The weight of the empty drum = $\frac{46}{6}$ kg

**Step 3**

So,

$$\begin{aligned}\text{Weight of rice in the drum} &= \text{Weight of the drum full of rice} - \text{ Weight of the empty drum} \\ &= \frac{275}{7} - \frac{46}{6} \\ &= \frac{(275 \times 6 - 46 \times 7)}{7 \times 6} = \frac{664}{21}\end{aligned}$$

**Step 4**

Thus, the weight of the rice in the drum is $\frac{664}{21}$ kg.

**(4)** **d.** not a rational number

**Step 1**

A rational number is any number that can be expressed as the quotient or fraction $\frac{p}{q}$ of two integers, p and q, with the denominator q not equal to zero. Since q may be equal to 1, every integer is a rational number.

$\frac{6}{0}$ is not a rational number because denominator of the rational numbers can not be zero(0).

**Step 2**

Therefore $\frac{6}{0}$ is ***not a rational number.*** .

**(5)** 8

**Step 1**

We can write the given expression as:

$\frac{1}{10} \times \frac{1}{6} \times 480$

$= \frac{1}{1} \times \frac{1}{6} \times 48$ **(As zeros of 10 and 480 cancel out each other)**

$= 8$ **(As 6 × 8 = 48)**

**Step 2**

Thus, $\frac{1}{10}$ of $\frac{1}{6}$ of 480 is **8.**

**(6)** $\frac{-1}{9}$

**Step 1**

Let's first ignore the negative sign of the numbers, and check the order of absolute values of the fractions.
We know that if numerator of fractions are same, fraction with smaller denominator is larger.
Therefore,

$\frac{1}{9} > \frac{1}{12} > \frac{1}{14}$

**Step 2**

We also know that for negative numbers, number with higher absolute value is smaller,

$\frac{-1}{9} < \frac{-1}{12} < \frac{-1}{14}$

Or,

$\frac{-1}{9} < \frac{1}{-12} < \frac{-1}{14}$

**Step 3**

Therefore, $\frac{-1}{9}$ is smaller than other two given fractions.

**(7)** $\frac{221}{30}\ m$

**Step 1**

We have given that:

Total length of the rope $= 12\ m$

Length of first piece $= \frac{9}{5}\ m$

Length of second piece $= \frac{17}{6}\ m$

So,

$$\text{Total length of the two pieces } = (\frac{9}{5} + \frac{17}{6}) = \frac{9 \times 6 + 17 \times 5}{5 \times 6} = \frac{139}{30} m$$

**Step 2**

$$\begin{aligned} \therefore \text{ The length of remaining rope} &= \text{Total length of rope} - \text{Total length of the two pieces} \\ &= 12 - \frac{139}{30} \\ &= \frac{360 - 139}{30} \\ &= \frac{221}{30}\ m \end{aligned}$$

**Step 3**

Thus, the length of the remaining rope is $\frac{221}{30}\ m$ .

**(8)** $\frac{6}{143}$ , $\frac{4}{143}$ , $\frac{3}{143}$ , $\frac{12}{715}$ , $\frac{2}{143}$ , $\frac{12}{1001}$ (Answers can vary).

**Step 1**

**Rational numbers:** A rational number is any number that can be expressed as the quotient or fraction p/q of two integers, p and q, with the denominator q not equal to zero. Since q may be equal to 1, every integer is a rational number.

**Step 2**

By a simple logic, we can say that to find a number lying between any two given numbers **x** and **y**, we can add them and divide the sum by 2. The same method can be adopted to find a rational number between two rational numbers as well.

So between $\frac{7}{13}$ and $\frac{-5}{11}$ , we have: $\frac{\frac{7}{13} + \frac{-5}{11}}{2} = \frac{6}{143}$ ,

between $\frac{7}{13}$ and $\frac{6}{143}$ , we have : $\frac{\frac{7}{13} + \frac{6}{143}}{2} = \frac{4}{143}$ ,

between $\frac{7}{13}$ and $\frac{4}{143}$ , we have : $\frac{\frac{7}{13} + \frac{4}{143}}{2} = \frac{3}{143}$ ,

between $\frac{7}{13}$ and $\frac{3}{143}$ , we have : $\frac{\frac{7}{13} + \frac{3}{143}}{2} = \frac{12}{715}$ ,

between $\frac{7}{13}$ and $\frac{12}{715}$ , we have : $\frac{\frac{7}{13} + \frac{12}{715}}{2} = \frac{2}{143}$ ,

between $\frac{7}{13}$ and $\frac{2}{143}$ , we have : $\frac{\frac{7}{13} + \frac{2}{143}}{2} = \frac{12}{1001}$

**Step 3**

Hence, 6 rational numbers between $\frac{7}{13}$ and $\frac{-5}{11}$ can be: $\frac{6}{143}$ , $\frac{4}{143}$ , $\frac{3}{143}$ , $\frac{12}{715}$ , $\frac{2}{143}$ , $\frac{12}{1001}$ .

**(9)** $\frac{2}{3}$

**Step 1**

As $0$ is the additive identity, the sum of any rational number and $0$ is the rational number itself, i.e., $(\frac{a}{b}+0)=(0+\frac{a}{b})=\frac{a}{b}$, for every rational number $\frac{a}{b}$.

**Step 2**

Thus, $\frac{2}{3}+0=\frac{2}{3}$

**(10)** 3690 m

**Step 1**

We are told that the speed of the train is 54 km per hour. This means that the train travels a distance of 54 km in one hour.

**Step 2**

Also, the train crosses the tunnel in 4 minutes and 6 seconds.

Converting the time in minutes.

4 minutes and 6 seconds = 4 minutes + $\frac{6}{60}$ minutes = $\frac{246}{60}$ minutes

Converting the time in hours.

$\frac{246}{60}$ minutes = $\frac{246}{3600}$ hours

**Step 3**

Distance traveled by the train in 1 hour = 54 km

So, distance traveled by the train in $\frac{246}{3600}$ hours = 54 km × $\frac{246}{3600}$ = 3.69 km = 3690 m

**Step 4**

Therefore, the length of the tunnel is **3690 m**.