

Exercise -1.1

1.

Sol:

Yes, zero is a rotational number. It can be written in the form of $\frac{p}{q}$ where q to as such as

$$\frac{0}{3}, \frac{0}{5}, \frac{0}{11}, \text{etc.....}$$

2.

Sol:

Given to find five rotational numbers between 1 and 2

A rotational number lying between 1 and 2 is

$$(1+2) \div 2 = 3 \div 2 = \frac{3}{2} \quad \text{i.e., } 1 < \frac{3}{2} < 2$$

Now, a rotational number lying between 1 and $\frac{3}{2}$ is

$$\left(1 + \frac{3}{2}\right) \div 2 = \left(\frac{2+3}{2}\right) \div 2 = \frac{5}{2} \div 2 = \frac{5}{2} \times \frac{1}{2} = \frac{5}{4}$$

$$\text{i.e., } 1 < \frac{5}{4} < \frac{3}{2}$$

Similarly, a rotational number lying between 1 and $\frac{5}{4}$ is

$$\left(1 + \frac{5}{4}\right) \div 2 = \left(\frac{4+5}{4}\right) \div 2 = \frac{9}{4} \div 2 = \frac{9}{4} \times \frac{1}{2} = \frac{9}{8}$$

$$\text{i.e., } 1 < \frac{9}{8} < \frac{5}{4}$$

Now, a rotational number lying between $\frac{3}{2}$ and 2 is

$$\left(1 + \frac{5}{4}\right) \div 2 = \left(\frac{4+5}{4}\right) \div 2 = \frac{9}{4} \div 2 = \frac{9}{4} \times \frac{1}{2} = \frac{9}{8}$$

$$\text{i.e., } 1 < \frac{9}{8} < \frac{5}{4}$$

Now, a rotational number lying between $\frac{3}{2}$ and 2 is

$$\left(\frac{3}{2} + 2\right) \div 2 = \left(\frac{3+4}{2}\right) \div 2 = \frac{7}{2} \times \frac{1}{2} = \frac{7}{4}$$

$$\text{i.e., } \frac{3}{2} < \frac{7}{4} < 2$$

Similarly, a rotational number lying between $\frac{7}{4}$ and 2 is

$$\left(\frac{7}{4} + 2\right) \div 2 = \left(\frac{7+8}{4}\right) \div 2 = \frac{15}{4} \times \frac{1}{2} = \frac{15}{8}$$

$$\text{i.e., } \frac{7}{4} < \frac{15}{8} < 2$$

$$\therefore 1 < \frac{9}{8} < \frac{5}{4} < \frac{3}{2} < \frac{7}{4} < \frac{15}{8} < 2$$

Recall that to find a rational number between r and s , you can add r and s and divide the sum by 2, that is $\frac{r+s}{2}$ lies between r and s . So, $\frac{3}{2}$ is a number between 1 and 2. you can proceed in this manner to find four more rational numbers between 1 and 2, These four numbers are, $\frac{5}{4}, \frac{11}{8}, \frac{13}{8}$ and $\frac{7}{4}$

3.

Sol:

Given to find six rotational number between 3 and 4

We have,

$$3 \times \frac{7}{7} = \frac{21}{7} \text{ and } 4 \times \frac{7}{7} = \frac{28}{7}$$

We know that

$$21 < 22 < 23 < 24 < 25 < 26 < 27 < 28$$

$$\Rightarrow \frac{21}{7} < \frac{22}{7} < \frac{23}{7} < \frac{24}{7} < \frac{25}{7} < \frac{26}{7} < \frac{27}{7} < \frac{28}{7}$$

$$\Rightarrow 3 < \frac{22}{7} < \frac{23}{7} < \frac{24}{7} < \frac{25}{7} < \frac{26}{7} < \frac{27}{7} < 4$$

Hence, 6 rotational number between 3 and 4 are

$$\frac{22}{7}, \frac{23}{7}, \frac{24}{7}, \frac{25}{7}, \frac{26}{7}, \frac{27}{7}$$

4.

Sol:

Given to find 5 rotational numbers lying between $\frac{3}{5}$ and $\frac{4}{5}$.

We have,

$$\frac{3}{5} \times \frac{6}{6} = \frac{18}{100} \text{ and } \frac{4}{5} \times \frac{6}{6} = \frac{24}{30}$$

We know that

$$18 < 19 < 20 < 21 < 22 < 23 < 24$$

$$\Rightarrow \frac{18}{30} < \frac{19}{30} < \frac{20}{30} < \frac{21}{30} < \frac{22}{30} < \frac{23}{30} < \frac{24}{30}$$

$$\Rightarrow \frac{3}{5} < \frac{19}{30} < \frac{20}{30} < \frac{21}{30} < \frac{22}{30}, \frac{23}{30}, \frac{4}{5}$$

$$\Rightarrow \frac{3}{5} < \frac{19}{30} < \frac{2}{3} < \frac{7}{10} < \frac{11}{15} < \frac{23}{30} < \frac{4}{5}$$

Hence, 5 rotational number between $\frac{3}{5}$ and $\frac{4}{5}$ are

$$\frac{19}{30}, \frac{2}{3}, \frac{7}{10}, \frac{11}{15}, \frac{23}{30}.$$

5.

Sol:

- (i) False. As whole numbers include zero, whereas natural number does not include zero
- (ii) True. As integers are a part of rotational numbers.
- (iii) False. As integers are a part of rotational numbers.
- (iv) True. As whole numbers include all the natural numbers.
- (v) False. As whole numbers are a part of integers
- (vi) False. As rotational numbers includes all the whole numbers.