Number Systems (Math)

Exercise 1.1 Page 5

Question 1:

Is zero a rational number? Can you write it in the form, $\frac{p}{q}$ where p and q are integers and $q \neq 0$?

Answer:

Yes. Zero is a rational number as it can be represented as $\frac{0}{1} \text{ or } \frac{0}{2} \text{ or } \frac{0}{3}$ etc.

Question 2:

Find six rational numbers between 3 and 4.

Answer:

There are infinite rational numbers in between 3 and 4.

3 and 4 can be represented as $\frac{24}{8} \text{ and } \frac{32}{8}$ respectively.

Therefore, rational numbers between 3 and 4 are

$$\frac{25}{8}, \frac{26}{8}, \frac{27}{8}, \frac{28}{8}, \frac{29}{8}, \frac{30}{8}$$

Question 3:

Find five rational numbers between. $\frac{3}{5}$ and $\frac{4}{5}$

Answer:

There are infinite rational numbers between. $\frac{3}{5}$ and $\frac{4}{5}$

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

Therefore, rational numbers between $\frac{3}{5}$ and $\frac{4}{5}$ are

$$\frac{19}{30},\frac{20}{30},\frac{21}{30},\frac{22}{30},\frac{23}{30}$$

Question 4:

State whether the following statements are true or false. Give reasons for your answers.

(i) Every natural number is a whole number.

(ii) Every integer is a whole number.

(iii) Every rational number is a whole number.

Answer:

(i) True; since the collection of whole numbers contains all natural numbers.

(ii) False; as integers may be negative but whole numbers are positive. For example: −3 is an integer but not a whole number.

(iii) False; as rational numbers may be fractional but whole numbers may not be. For example: is a rational number bu$\frac{1}{5}$not a whole number.