

## RATIONAL NUMBERS

7<sup>th</sup> Standard

Q1 How many whole numbers are there between each of the following?

a 0 and 1 → No, whole numbers

b 80 and 89 → 8 whole numbers i.e. 81, 82, 83, 84, 85, 86, 87, 88

c and d do your self.

Q2 Fill in the blanks.

a  $\frac{8}{7} = \frac{x}{49}$

Sol  $\frac{8}{7} \times \frac{7}{7} = \frac{56}{49}$       $x = \underline{56}$

b.  $\frac{15}{x} = \frac{75}{100}$

=  $\frac{15}{20} \times \frac{5}{5} = \frac{75}{100}$       $x = 20$

e =  $\frac{9}{11} = \frac{45}{x}$

=  $\frac{9}{11} \times \frac{5}{5} = \frac{45}{55}$

$x = 55$

c, d, f do your self.

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Evaluate and write the answers in lowest term

$$Q3 \quad a \quad \frac{1}{5} \times \frac{3}{8}$$

$$= \frac{1}{5} \times \frac{3}{8} = \frac{3}{40}$$

$$b. \quad \frac{2}{20} \times \frac{15}{7}$$

$$= \frac{1}{2} \times \frac{3}{7} = \frac{3}{14}$$

$$c \quad \frac{16}{5} \div \frac{1}{5}$$

$$= \frac{16}{5} \times \frac{5}{1}$$

$$= \frac{16}{1} \times \frac{1}{1} = 16$$

$$d. \quad \frac{27}{36} \div \frac{2}{3}$$

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

$$= \frac{9}{4} \times \frac{1}{2} = \frac{9}{8}$$

Q4 Find the value of the following

$$a \quad (-8) + (-4)$$

$$= -8 - 4$$

$$= -12 \text{ ans}$$

$$\left[ \begin{array}{l} (+) \times (+) = + \\ (-) \times (-) = + \\ (+) \times (-) = - \\ (-) \times (+) = - \end{array} \right]$$

$$b, \quad 24 - (-12)$$

$$= 24 + 12$$

$$= 36 \text{ ans}$$

$$c \quad (-19) + 26$$

$$= -19 + 26$$

$$= 7 \text{ ans}$$

$$e \quad (-4) - (-12) - (-36)$$

$$= -4 + 12 + 36$$

$$= -4 + 48$$

$$= 44 \text{ ans}$$

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Q5 Put the correct symbol  $>$  or  $<$  in the given boxes.

a  $11 \times 2 - (-3)$    $11 \times (-2) - (-3)$

$= 22 + 3$    $- 22 + 3$   
 $= 25$    $- 19$

b  $(-18) \div (-3)$    $(-18) \cdot 3$

$\frac{-18}{-3} = 6$    $-54$

$= 6$    $-54$

### Ex 4.2

Q1 Which of the following are rational numbers.

a  $-\frac{6}{11}$ ; b  $-\frac{8}{-13}$ ; c  $\frac{5}{15}$ ; d  $-\frac{8}{-12}$ ; e 0; f  $\frac{0}{1}$ ; g  $\frac{1}{0}$ ;

h -7

Sol All the above are rational numbers except  $\frac{1}{0}$  because a rational number is always expressed in the form of  $\frac{p}{q}$ , where p and q are integers and  $q \neq 0$ .

Q2 Write each of the following integers as a rational number. Also write the numerators and denominators of each rational number.

a  $\frac{42}{1} = \frac{\text{Numerator}}{\text{Denominator}}$

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$$b \quad \frac{-72}{1} = \frac{\text{Numerator}}{\text{Denominator}} \quad c \quad \frac{0}{1} = \frac{N}{D}$$

Q3 Write each of the following rational numbers with a positive denominator.

$$a \quad \frac{8}{-11} = \frac{-8}{11} \quad b \quad \frac{-14}{-19} = \frac{14}{19} \quad c \quad \frac{3}{-5} = \frac{-3}{5}$$

Q4 Do it yourself.

Q5 Find four rational numbers equivalent to each of the following rational numbers.

$$a \quad \frac{2}{5} \times \frac{2}{2} = \frac{4}{10}$$

$$b \quad \frac{-5}{7} \times \frac{2}{2} = \frac{-10}{14}$$

$$\frac{2}{5} \times \frac{3}{3} = \frac{6}{15}$$

$$\frac{-5}{7} \times \frac{3}{3} = \frac{-15}{21}$$

$$\frac{2}{5} \times \frac{4}{4} = \frac{8}{20}$$

$$\frac{-5}{7} \times \frac{4}{4} = \frac{-20}{28}$$

$$\frac{2}{5} \times \frac{5}{5} = \frac{10}{25}$$

$$\frac{-5}{7} \times \frac{5}{5} = \frac{-25}{35}$$

c and d - do yourself

Q6 Express  $\frac{-15}{16}$  as a rational number with

a Numerator -45

b Numerator 60

$$\frac{-15}{16} \times \frac{3}{3} = \frac{-45}{48}$$

$$\frac{-15}{16} \times \frac{4}{-4} = \frac{+60}{-64}$$

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Q7 Express  $\frac{1260}{-1540}$  as rational number with

a Numerator -63

$$\frac{1260}{-1540} \div \frac{-20}{-20} = \frac{-63}{77}$$

$$\begin{array}{r} 20 \\ 63 \overline{) 1260} \\ \underline{126} \\ 0 \\ \underline{0} \\ 0 \end{array}$$

b Denominator 385

$$\frac{1260}{-1540} \div \frac{-4}{-4} = \frac{315}{385}$$

$$\begin{array}{r} 4 \\ 315 \overline{) 1260} \\ \underline{1260} \\ 0 \end{array}$$

Q8 Express the following rational number in standard form

a  $\frac{-19}{76} = \frac{-1}{4} = \frac{-1}{4}$

b  $\frac{-225}{625} = \frac{-45}{125} = \frac{-9}{25}$

c  $\frac{-288}{384} = \frac{-144}{192} = \frac{-72}{96} = \frac{-36}{48} = \frac{-18}{24} = \frac{-9}{12} = \frac{-3}{4}$

## Ex 4.3

Q2 Which is greater

$$-\frac{5}{6} \text{ and } -\frac{6}{5}$$

$$\begin{aligned} \text{LCM of } 6 \text{ \& } 5 \\ &= 2 \times 3 \times 5 \\ &= 30 \end{aligned}$$

$$\begin{array}{r} \text{LCM} \\ 2 \overline{) 6, 5} \\ \underline{2} \phantom{, 5} \\ 3, 5 \\ 3 \overline{) 3, 5} \\ \underline{3} \phantom{, 5} \\ 1, 5 \\ 5 \overline{) 1, 5} \\ \underline{5} \\ 1, 1 \end{array}$$

$$= -\frac{5}{6} \times \frac{5}{5} = \frac{-25}{30}$$

$$\frac{-25}{30} > \frac{-36}{30}$$

$$= -\frac{6}{5} \times \frac{6}{6} = \frac{-36}{30}$$

$$\text{or } -\frac{5}{6} > -\frac{6}{5}$$

b 
$$\frac{9}{14} \text{ and } \frac{16}{21}$$

$$\begin{aligned} \text{LCM of } 14 \text{ \& } 21 \\ &= 7 \times 2 \times 3 \\ &= 42 \end{aligned}$$

$$\begin{array}{r} \text{LCM} \\ 7 \overline{) 14, 21} \\ \underline{7} \phantom{, 21} \\ 2, 3 \\ 2 \overline{) 2, 3} \\ \underline{2} \phantom{, 3} \\ 1, 3 \\ 3 \overline{) 1, 3} \\ \underline{3} \\ 1, 1 \end{array}$$

$$\frac{9}{14} \times \frac{3}{3} = \frac{27}{42}$$

$$\frac{27}{42} < \frac{32}{42}$$

$$\frac{16}{21} \times \frac{2}{2} = \frac{32}{42}$$

$$\frac{9}{14} < \frac{16}{21}$$

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$$e \quad \frac{21}{-27} \quad \text{or} \quad \frac{17}{-51}$$

$$= \frac{-21}{27} \quad \text{or} \quad \frac{-17}{51}$$

$$\begin{aligned} \text{LCM of } 27, 51 \\ &= 3 \times 3 \times 3 \times 17 \\ &= 459 \end{aligned}$$

$$\begin{array}{r|l} 3 & 27, 51 \\ \hline 3 & 9, 17 \\ \hline 3 & 3, 17 \\ \hline 17 & 1, 17 \\ \hline & 1, 1 \end{array}$$

$$\frac{-21}{27} \times \frac{17}{17} = \frac{-357}{459}$$

$$\frac{-17}{51} \times \frac{9}{9} = \frac{-153}{459}$$

$$\frac{-357}{459} < \frac{-153}{459}$$

$$\frac{-21}{27} < \frac{-17}{51}$$

Q3 Put The appropriate symbol =, < or > in the box

$$\left[ -\frac{4}{3} \right] \square \left[ -\frac{1}{2} \right]$$

$$\begin{aligned} \text{LCM} \\ &= 3 \times 2 = 6 \end{aligned}$$

$$\begin{array}{r|l} 3 & 3, 2 \\ \hline 2 & 1, 2 \\ \hline & 1, 1 \end{array}$$

$$-\frac{4}{3} \times \frac{2}{2} = \frac{-8}{6}$$

$$-\frac{1}{2} \times \frac{3}{3} = \frac{-3}{6}$$

$$-\frac{1}{2} \times \frac{3}{3} = \frac{-3}{6}$$

$$\frac{-8}{6} < \frac{-3}{6}$$

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

$$b \left( \frac{-5}{7} \right) < \left( \frac{-2}{7} \right)$$

$$\frac{-5}{7} < \frac{-2}{7}$$

$$c \quad \frac{9}{11} \quad \frac{2}{5}$$

$$\begin{array}{r|l} 11 & 11, 5 \\ \hline 5 & 1, 5 \\ \hline & 1, 1 \end{array}$$

$$\text{LCM of } 11, 5 = 11 \times 5 = 55$$

$$\frac{9}{11} \times \frac{5}{5} = \frac{45}{55}$$

$$\frac{2}{5} \times \frac{11}{11} = \frac{22}{55}$$

$$\frac{45}{55} > \frac{22}{55}$$

$$= \frac{9}{11} > \frac{2}{5}$$

Q4 Write the following in ascending order

$$a \quad \frac{-1}{3}, \frac{-5}{7}, \frac{-4}{9}$$

$$\begin{array}{r|l} & \text{LCM of } 3, 7, 9 \\ \hline 3 & 3, 7, 9 \\ \hline 3 & 1, 7, 3 \\ \hline 7 & 1, 7, 1 \\ \hline & 1, 1, 1 \end{array}$$

$$\text{LCM} = 3 \times 3 \times 7 = 63$$

$$\frac{-1}{3} \times \frac{21}{21} = \frac{-21}{63}$$

$$\frac{-5}{7} \times \frac{9}{9} = \frac{-45}{63}$$

$$\frac{-4}{9} \times \frac{7}{7} = \frac{-28}{63}$$

$$\frac{-21}{63}, \frac{-45}{63}, \frac{-28}{63}$$

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$$-\frac{45}{63} < -\frac{28}{63} < -\frac{21}{63}$$

$$-\frac{5}{7} < -\frac{4}{9} < -\frac{1}{3}$$

$$c \quad -\frac{3}{10}, \frac{2}{-5}, \frac{4}{15} = -\frac{3}{10}, -\frac{2}{5}, \frac{4}{15}$$

LCM of 10, 5 and 15

5	10, 5, 15
2	2, 1, 3
3	1, 1, 3
	1, 1, 1

$$\text{L.C.M.} = 5 \times 2 \times 3 \times 1$$

$$= 30$$

$$-\frac{3}{10} \times \frac{3}{3} = -\frac{9}{30}$$

$$-\frac{2}{5} \times \frac{6}{6} = -\frac{12}{30}$$

$$\frac{4}{15} \times \frac{2}{2} = \frac{6}{30}$$

$$= -\frac{9}{30}, -\frac{12}{30}, \frac{6}{30}$$

$$= -\frac{12}{30} < -\frac{9}{30} < \frac{6}{30}$$

$$= -\frac{2}{5} < -\frac{3}{10} < \frac{4}{15}$$

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Q5 Write the following in descending order.

$$\frac{3}{4}, \frac{11}{8}, \frac{9}{16}, \frac{1}{2}$$

L.C.M of 4, 8, 16, 2

$$\begin{array}{r|l} 2 & 4, 8, 16, 2 \\ \hline 2 & 2, 4, 8, 1 \\ \hline 2 & 1, 2, 4, 1 \\ \hline 2 & 1, 1, 2, 1 \\ \hline & 1, 1, 1, 1 \end{array}$$

$$\begin{aligned} \text{L.C.M} &= 2 \times 2 \times 2 \times 2 \times 1 \\ &= 16 \end{aligned}$$

$$\frac{3}{4} \times \frac{4}{4} = \frac{12}{16}$$

$$\frac{11}{8} \times \frac{2}{2} = \frac{22}{16}$$

$$\frac{9}{16} \times \frac{1}{1} = \frac{9}{16}$$

$$\frac{1}{2} \times \frac{8}{8} = \frac{8}{16}$$

$$\frac{12}{16}, \frac{22}{16}, \frac{9}{16}, \frac{8}{16}$$

$$= \frac{8}{16} < \frac{9}{16} < \frac{12}{16} < \frac{22}{16} > \frac{12}{16} > \frac{9}{16} > \frac{8}{16}$$

$$= \frac{1}{2} < \frac{9}{16} < \frac{3}{4} < \frac{11}{8} > \frac{3}{4} > \frac{9}{16} > \frac{1}{2}$$

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b do your self

$$c \quad \frac{3}{-5}, \quad \frac{7}{-50}, \quad \frac{-9}{25}$$

$$= \frac{-3}{5}, \quad \frac{-7}{50}, \quad \frac{-9}{25}$$

L.C.M of 5, 50 and 25

5	5, 50, 25
5	1, 10, 5
2	1, 2, 1
	1, 1, 1

$$\begin{aligned} \text{L.C.M} &= 5 \times 5 \times 2 \times 1 \\ &= 50 \end{aligned}$$

$$\frac{-3}{5} \times \frac{10}{10} = \frac{-30}{50}$$

$$\frac{-7}{50} \times \frac{1}{1} = \frac{-7}{50}$$

$$\frac{-9}{25} \times \frac{2}{2} = \frac{-18}{50}$$

$$\frac{-30}{50}, \quad \frac{-7}{50}, \quad \frac{-18}{50}$$

$$= \frac{-7}{50} > \frac{-18}{50} > \frac{-30}{50}$$

$$= \frac{-7}{50} > \frac{-9}{25} > \frac{-3}{5}$$

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Q6 Give any five rational numbers between

a -2 and 0

$$= \frac{-2}{1} \text{ and } \frac{0}{1}$$

$$= \frac{-2}{1} \times \frac{3}{3} = \boxed{\frac{-6}{3}}$$

$$= \frac{0}{1} \times \frac{3}{3} = \boxed{\frac{0}{3}}$$

Now rational numbers between

$\frac{-6}{3}$  and  $\frac{0}{3}$  are

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

b -3 and -2

$$= \frac{-3}{1} \text{ and } \frac{-2}{1}$$

$$= \frac{-3}{1} \times \frac{6}{6} = \boxed{\frac{-18}{6}}$$

$$= \frac{-2}{1} \times \frac{6}{6} = \boxed{\frac{-12}{6}}$$

Rational numbers between

$\frac{-18}{6}$  and  $\frac{-12}{6}$  are

$$= \frac{-17}{6}, \frac{-16}{6}, \frac{-15}{6}, \frac{-14}{6}, \frac{-13}{6}$$

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