

VIII Homework-1 (RATIONAL NUMBERS)

1) Write the following rational numbers in standard form

(i) $\frac{15}{20}$ (ii) $\frac{64}{72}$ (iii) $\frac{-54}{-63}$ (iv) $\frac{88}{-99}$ (v) $\frac{-87}{156}$

2) Write four rational numbers equivalent to each of the following

(i) $-\frac{3}{5}$ (ii) $\frac{7}{-11}$ (iii) $\frac{-6}{-13}$

3) Which pairs of rational numbers are not equivalent?

(a) $\frac{15}{19}, \frac{-15}{-19}$ (b) $\frac{16}{20}, \frac{4}{-5}$

4) Compare. Write $<$, $>$ or $=$ (a) $-\frac{5}{3}$ \square $\frac{40}{27}$ (b) $-\frac{1}{8}$ \square $\frac{4}{-32}$

5) Arrange in ascending order $-\frac{1}{4}, \frac{1}{2}, \frac{7}{8}, \frac{15}{16}, -\frac{9}{40}$

6) Find the value of

(a) $-8\frac{4}{5} - \frac{3}{5}$ (b) $5\frac{4}{5} + (-3\frac{2}{7})$

7) Simplify:

$$5\frac{7}{9} - 1\frac{1}{10} - 7\frac{11}{15}$$

8) Multiply: $\frac{25}{4} \times (-\frac{8}{9}) \times (-3\frac{9}{11}) \times \frac{22}{-35}$

9) Divide: $-1\frac{11}{14} \div (-1\frac{7}{18})$

10) Simplify: $[5\frac{1}{2} \times (-1\frac{5}{6})] \div 2\frac{3}{4}$

11) Rational numbers are closed under $\underline{\quad}$, $\underline{\quad}$ and $\underline{\quad}$ but not closed under $\underline{\quad}$

12) $\underline{\quad}$ and $\underline{\quad}$ are commutative for rational numbers but $\underline{\quad}$ and $\underline{\quad}$ are not.

13) The sum of any rational number and $\underline{\quad}$ is the number itself.

14) The product of any rational number and $\underline{\quad}$ is the number itself

15) Sum of a rational number and its additive inverse is $\underline{\quad}$

16) Product of a rational number and its reciprocal is $\underline{\quad}$

17) Using distributivity, find $[\frac{8}{15} \times (-\frac{7}{18})] + [\frac{8}{15} \times -\frac{11}{18}]$

18) Verify and state the property used: $(-\frac{1}{2} + \frac{3}{7}) + (-\frac{4}{3}) = -\frac{1}{2} + (\frac{3}{7} + -\frac{4}{3})$

19) Find the additive inverse: (a) $-\frac{15}{-16}$ (b) $\frac{20}{-23}$

20) Write the multiplicative inverse

(a) $-\frac{29}{-36}$ (b) $16 \div (-32)$ (c) $\frac{5}{8} \div \frac{15}{16} \times (-\frac{3}{2})$

VIII Homework-1 (Answers)

$$1) (i) \frac{15 \div 5}{20 \div 5} = \frac{3}{4} //$$

$$(ii) \frac{64 \div 8}{72 \div 8} = \frac{8}{9} //$$

$$(iii) \frac{-54 \div -9}{-63 \div -9} = \frac{6}{7} //$$

$$(iv) \frac{88 \div -11}{-99 \div -11} = \frac{-8}{9} //$$

$$(v) \frac{-87 \div 3}{156 \div 3} = \frac{-29}{52} //$$

$$2) (i) \frac{-3 \times 2}{5 \times 2} = \frac{-6}{10}$$

$$\frac{-3 \times 4}{5 \times 4} = \frac{-12}{20}$$

$$\frac{-3 \times 3}{5 \times 3} = \frac{-9}{15}$$

$$\frac{-3 \times 5}{5 \times 5} = \frac{-15}{25}$$

\therefore Four rational numbers equivalent to $-\frac{3}{5}$

are $-\frac{6}{10}$, $-\frac{9}{15}$, $-\frac{12}{20}$ and $-\frac{15}{25}$

$$(ii) \frac{7 \times 2}{-11 \times 2} = \frac{14}{-22}$$

$$\frac{7 \times 4}{-11 \times 4} = \frac{28}{-44}$$

$$\frac{7 \times 3}{-11 \times 3} = \frac{21}{-33}$$

$$\frac{7 \times 5}{-11 \times 5} = \frac{35}{-55}$$

\therefore Four rational numbers equivalent to $\frac{7}{-11}$ are

$\frac{14}{-22}$, $\frac{21}{-33}$, $\frac{28}{-44}$ and $\frac{35}{-55}$

$$(iii) \frac{-6 \times 2}{-13 \times 2} = \frac{-12}{-26}$$

$$\frac{-6 \times 4}{-13 \times 4} = \frac{-24}{-52}$$

$$\frac{-6 \times 3}{-13 \times 3} = \frac{-18}{-39}$$

$$\frac{-6 \times 5}{-13 \times 5} = \frac{-30}{-65}$$

\therefore Four rational numbers equivalent to $-\frac{6}{13}$ are

$-\frac{12}{-26}$, $-\frac{18}{-39}$, $-\frac{24}{-52}$ and $-\frac{30}{-65}$

$$3) (a) \frac{15}{19} \overset{\text{red arrows}}{\sim} \frac{-15}{-19}$$

$$15 \times -19 = -285$$

$$19 \times -15 = -285$$

$\therefore \frac{15}{19}$ and $\frac{-15}{-19}$ are equivalent rational numbers

$$(b) \frac{16}{20} \overset{\text{red arrows}}{\not\sim} \frac{4}{-5}$$

$$16 \times -5 = -80$$

$$20 \times 4 = 80$$

$\therefore \frac{16}{20}$ and $\frac{4}{-5}$ are not equivalent rational numbers.

$$4) (a) -\frac{5}{3} \boxed{<} \frac{40}{27}$$

$$-\frac{5 \times 9}{3 \times 9} \quad \frac{40}{27}$$

$$-\frac{45}{27} < \frac{40}{27}$$

$$(b) -\frac{1}{8} \boxed{=} \frac{4}{-32}$$

$$-\frac{1 \times -4}{8 \times -4} \quad \frac{4}{-32}$$

$$\frac{4}{-32} = \frac{4}{-32}$$

$$5) \quad -\frac{1 \times 20}{4 \times 20} \quad \frac{1 \times 40}{2 \times 40} \quad \frac{7 \times 10}{8 \times 10} \quad \frac{15 \times 5}{16 \times 5} \quad -\frac{9 \times 2}{40 \times 2} \quad \begin{array}{l} 4 \mid 4, 2, 8, 16, 40 \\ 2 \mid 1, 2, 2, 4, 10 \\ \quad 1, 1, 1, 2, 5 \end{array}$$

$$\Rightarrow -\frac{20}{80} \quad \frac{40}{80} \quad \frac{70}{80} \quad \frac{75}{80} \quad -\frac{18}{80}$$

$$\text{LCM} = 8 \times 10 = 80$$

$$\Rightarrow -\frac{20}{80}, -\frac{18}{80}, \frac{40}{80}, \frac{70}{80}, \frac{75}{80}$$

$$\therefore -\frac{1}{4} < -\frac{9}{40} < \frac{1}{2} < \frac{7}{8} < \frac{15}{16}$$

$$6) (a) -8\frac{4}{5} - \frac{3}{5}$$

$$= -\frac{44}{5} - \frac{3}{5} = \frac{-44-3}{5} = \underline{\underline{-\frac{47}{5}}}$$

$$(b) 5\frac{4}{5} + (-3\frac{2}{7})$$

$$= \frac{29 \times 7}{5 \times 7} - \frac{23 \times 5}{7 \times 5} = \frac{203}{35} - \frac{115}{35} = \underline{\underline{\frac{88}{35}}}$$

$$7) 5\frac{7}{9} - 1\frac{1}{10} - 7\frac{11}{15}$$

$$= \frac{52 \times 10}{9 \times 10} - \frac{11 \times 9}{10 \times 9} - \frac{116 \times 6}{15 \times 6}$$

$$= \frac{520 - 99 - 696}{90}$$

$$= \frac{-275}{90} = \underline{\underline{-\frac{55}{18}}}$$

$$\begin{array}{l} 3 | 9, 10, 15 \\ 5 | 3, 10, 15 \\ 3, 2, 1 \end{array}$$

$$\text{LCM} = 15 \times 6 = 90$$

$$8) \frac{25}{4} \times \frac{-8}{9} \times \frac{42}{11} \times \frac{22}{-35} = -\frac{5 \times 2 \times 2 \times 2}{3}$$

$$= \underline{\underline{-\frac{40}{3}}}$$

$$9) \frac{-25}{14} \div \frac{-25}{18}$$

$$= \frac{-25}{14} \times \frac{18}{25} = \underline{\underline{\frac{9}{7}}}$$

$$10) \left(5\frac{1}{2} \times -1\frac{5}{6} \right) \div 2\frac{3}{4}$$

$$= \left(\frac{11}{2} \times -\frac{11}{6} \right) \div \frac{11}{4}$$

$$= \frac{11}{2} \times -\frac{11}{6} \times \frac{4}{11} = \underline{\underline{-\frac{11}{3}}}$$

11) addition, subtraction, multiplication but not division
 [Since division by zero is not defined]

12) Addition, multiplication but subtraction, division are not

13) 0 [a + 0 = a]

14) 1 [a x 1 = a]

15) 0 [a + (-a) = 0]

16) 1 [a x $\frac{1}{a}$ = 1]

17) $\left(\frac{8}{15} \times \frac{-7}{18}\right) + \left(\frac{8}{15} \times \frac{-11}{18}\right)$

$$= \frac{8}{15} \times \left(\frac{-7}{18} + \frac{-11}{18}\right) = \frac{8}{15} \left(\frac{-7-11}{18}\right) = \frac{8}{15} \times \frac{-18}{18} = \frac{-8}{15}$$

18) LHS, $\left(-\frac{1 \times 7}{2 \times 7} + \frac{3 \times 2}{7 \times 2}\right) + \left(-\frac{4}{3}\right)$

$$= \left(\frac{-7+6}{14}\right) + \left(-\frac{4}{3}\right) = \frac{-1 \times 3}{14 \times 3} - \frac{4 \times 14}{3 \times 14} = \frac{-3-56}{42} = \frac{-59}{42}$$

RHS, $-\frac{1}{2} + \left(\frac{3 \times 3}{7 \times 3} - \frac{4 \times 7}{3 \times 7}\right)$

$$= -\frac{1}{2} + \left(\frac{9-28}{21}\right) = -\frac{1}{2} + \left(-\frac{19}{21}\right) = \frac{-1 \times 21}{2 \times 21} - \frac{19 \times 2}{21 \times 2} = \frac{-21-38}{42} = \frac{-59}{42}$$

∴ LHS = RHS. Hence verified

The property used is associative property of addition for rational numbers.

19) (a) additive inverse of $\frac{-15}{-16}$ is $\frac{-15}{16}$

(b) additive inverse of $\frac{20}{-23}$ is $\frac{20}{23}$

20) (a) Multiplicative inverse of $\frac{-29}{-36}$ is $\frac{-36}{-29}$ or $\frac{36}{29}$

(b) Multiplicative inverse of $16 \div (-32) = 16 \times \frac{-1}{32} = -\frac{1}{2}$

(c) Multiplicative inverse of $\frac{5}{8} \div \frac{15}{16} \times \left(-\frac{3}{2}\right) = \frac{5}{8} \times \frac{16}{15} \times \frac{-3}{2} = -1$

is -1