

Exercise 4.1

Q 1 . Write down the numerator of each of the following rational numbers :

(i) . $\frac{-7}{5}$

(ii) . $\frac{15}{-4}$

(iii) . $\frac{-17}{-21}$

(iv) . $\frac{8}{9}$

(v) . 5

SOLUTION :

Numerators are :

(i) . -7

(ii) . 15

(iii) . -17

(iv) . 8

(v) . 5

Q 2 . Write down the denominator of each of the following rational numbers:

(i) . $\frac{-4}{5}$

(ii) . $\frac{11}{-34}$

(iii) . $\frac{-15}{-82}$

(iv) . 15

(v) . 0

SOLUTION :

Denominators are :

(i) . 5

(ii) . -34

(iii). -82

(iv). 1

(v). 1

Q 3 . Write down the rational number whose numerator is $(-3) \times 4$, and whose denominator is $(34 - 23) \times (7 - 4)$.

SOLUTION :

According to the question :

$$\text{Numerator} = (-3) \times 4 = -12$$

$$\text{Denominator} = (34 - 23) \times (7 - 4) = 11 \times 3 = 33$$

$$\text{Therefore , Rational number} = \frac{-12}{33}$$

Q 4 .Write the following rational numbers as integers :

$$\frac{7}{1}, \frac{-12}{1}, \frac{34}{1}, \frac{-73}{1}, \frac{95}{1}$$

SOLUTION :

Integers are 7 , -12 , 34 , -73 and 95 .

Q 5 .Write the following integers as rational numbers with denominator 1 :

-15, 17, 85, -100

SOLUTION :

Rational numbers of given integers with denominator 1 are :

$$\frac{-15}{1}, \frac{17}{1}, \frac{85}{1}, \frac{-100}{1}$$

Q 6 .Write down the rational whose numerator is the smallest three digit number and denominator is the largest four digit number .

SOLUTION :

Smallest three digit number = 100

Largest four digit number = 9999

Therefore rational number = $\frac{100}{9999}$

Q 7 .Seperate positive and negative rational numbers from the following rational numbers :

$$\frac{-5}{-7}, \frac{12}{-5}, \frac{7}{4}, \frac{13}{-9}, 0, \frac{-18}{-7}, \frac{-95}{116}, \frac{-1}{-9}$$

SOLUTION :

Given rational numbers can be rewritten as :

$$\frac{5}{7}, \frac{-12}{5}, \frac{7}{4}, \frac{-13}{9}, 0, \frac{18}{7}, \frac{-95}{116}, \frac{1}{9}$$

Thus , positive rational numbers are :

$$\frac{5}{7}, \frac{7}{4}, \frac{18}{7}, \frac{1}{9}$$

Negative rational numbers are :

$$\frac{-12}{5}, \frac{-13}{9}, \frac{-95}{116}$$

Q 8 .Which of the following rational numbers are positive :

(i) . $\frac{-8}{7}$

(ii) . $\frac{9}{8}$

(iii) . $\frac{-19}{-13}$

(iv) . $\frac{-21}{13}$

SOLUTION :

The numbers can be rewritten as :

(i) $\cdot \frac{-8}{7}$

(ii) $\cdot \frac{9}{8}$

(iii) $\cdot \frac{19}{13}$

(iv) $\cdot \frac{-21}{13}$

Positive rational numbers are (ii) and (iii), i.e., $\frac{9}{8}$ and $\frac{-19}{-13}$

Q 9 .Which of the following rational numbers are negative ?

(i) $\cdot \frac{-3}{7}$

(ii) $\cdot \frac{-5}{-8}$

(iii) $\cdot \frac{9}{-83}$

(iv) $\cdot \frac{-115}{-197}$

SOLUTION :

The numbers can be rewritten as :

(i) $\cdot \frac{-3}{7}$

(ii) $\cdot \frac{5}{8}$

(iii) $\cdot \frac{-9}{83}$

(iv) $\cdot \frac{115}{197}$

Negative rational numbers are (i) and (iii) .

Exercise 4.2

Q 1 . Express each of the following as rational number with positive denominator :

(i) $\frac{-15}{-28}$

(ii) $\frac{6}{-9}$

(iii) $\frac{-28}{-11}$

(iv) $\frac{19}{-7}$

SOLUTION :

Rational number with positive denominators :

(i) Multiplying the number by -1, we get : $-15-28 = -15 \times -1-28 \times -1 = 1528$

(ii) Multiplying the number by -1, we get : $6-9 = 6 \times -1-9 \times -1 = -69$

(iii) Multiplying the number by -1, we get : $-28-11 = -28 \times -1-11 \times -1=2811$

(iv) Multiplying the number by -1, we get : $19-7 = 19 \times -1-7 \times -1 = -197$

Q 2 . Express $\frac{3}{5}$ as a rational number with numerator :

(i) 6

(ii) -15

(iii) 21

(iv) -27

SOLUTION :

Rational number with numerator :

(i) 6 is :

$$\frac{3 \times 2}{5 \times 2} = \frac{6}{10} \text{ (multiplying numerator and denominator by 2)}$$

(ii) -15 is :

$$\frac{3 \times -5}{5 \times -5} = -\frac{15}{25} \text{ (multiplying numerator and denominator by -5)}$$

(iii) 21 is :

$$\frac{3 \times 7}{5 \times 7} = \frac{21}{35} \text{ (multiplying numerator and denominator by 7)}$$

(iv) -27 is :

$$\frac{3 \times -9}{5 \times -9} = \frac{-27}{-45} \text{ (multiplying numerator and denominator by -9)}$$

Q 3 . Express $\frac{5}{7}$ as a rational number with denominator :

(i) -14

(ii) 70

(iii) -28

(iv) -84

SOLUTION :

$\frac{5}{7}$ as a rational number with denominator :

(1) -14 is :

$$\frac{5 \times -2}{7 \times -2} = \frac{-20}{-14} \text{ (Multiplying numerator and denominator by -2)}$$

(ii) 70 is :

$$\frac{5 \times 10}{7 \times 10} = \frac{50}{70} \text{ (Multiplying numerator and denominator by 10)}$$

(iii) -28 is :

$$\frac{5 \times -4}{7 \times -4} = \frac{-20}{-28} \text{ (Multiplying numerator and denominator by -4)}$$

(iv) -84 is :

$$\frac{5 \times -12}{7 \times -12} = \frac{-60}{-84} \text{ (Multiplying numerator and denominator by -12)}$$

Q 4 . Express $\frac{3}{4}$ as a rational number with denominator :

(i) 20

(ii) 36

(iii) 44

(iv) -80

SOLUTION :

$\frac{3}{4}$ as rational number with denominator:

(i) 20 is :

$$\frac{3 \times 5}{4 \times 5} = \frac{15}{20} \text{ (multiplying numerator and denominator by 5)}$$

(ii) 36 is :

$$\frac{3 \times 9}{4 \times 9} = \frac{27}{36} \text{ (multiplying numerator and denominator by 9)}$$

(iii) 44 is :

$$\frac{3 \times 11}{4 \times 11} = \frac{33}{44} \text{ (multiplying numerator and denominator by 11)}$$

(iv) -80 is :

$$\frac{3 \times -20}{4 \times -20} = \frac{-60}{-80} \text{ (multiplying numerator and denominator by -20)}$$

Q 5 . Express $\frac{2}{5}$ as a rational number with numerator :

(i) -56

(ii) 154

(iii) -750

(iv) -80

SOLUTION :

2/5 as a rational number with numerator :

(i) . -56 is :

$$\frac{2 \times -28}{5 \times -28} = \frac{-56}{-140} \text{ (multiplying numerator and denominator by -28)}$$

(ii) 154 is :

$$\frac{2 \times 77}{5 \times 77} = \frac{154}{385} \text{ (multiplying numerator and denominator by 77)}$$

(iii) -750 is :

$$\frac{2 \times -375}{5 \times -375} = \frac{-750}{-1875} \text{ (multiplying numerator and denominator by -375)}$$

(iv) 500 is :

$$\frac{2 \times 250}{5 \times 250} = \frac{500}{1250} \text{ (multiplying numerator and denominator by 250)}$$

Q 6 . Express $\frac{-192}{108}$ as a rational number with numerator :

(i) 64

(ii) -16

(iii) 32

(iv) -48

SOLUTION :

Rational number with numerator :

(i) 64 as numerator :

$$-192/-3 \text{ \& } 108/-3 = 64/-36 \text{ (Dividing the numerator and denomintor by -3)}$$

(ii) -16 as numerator :

$$-192/12 \text{ \& } 108/12 = -16/9 \text{ (Dividing the numerator and denomintor by 12)}$$

(iii) 32 as numerator :

$$-192/-6 \text{ \& } 108/-6 = 32/-18 \text{ (Dividing the numerator and denomintor by -6)}$$

(iv) -48 as numerator :

$$-192/4 \text{ \& } 108/4 = -48/27 \text{ (Dividing the numerator and denomintor by 4)}$$

Q 7 .Express $\frac{168}{-294}$ as a rational number with denominator :

(i) 14

(ii) -7

(iii) -49

(iv) 1470

SOLUTION :

Rational number with denominator:

(i) 14 as denominator :

$168/-21$ & $-294/-21 = -8/14$ (Dividing the numerator and denominator by -21)

(ii) -7 as denominator :

$168/42$ & $-294/42 = 4/-7$ (Dividing the numerator and denominator by 42)

(iii) -49 as denominator :

$168/6$ & $-294/6 = 28/-49$ (Dividing the numerator and denominator by 6)

(iv) 1470 as denominator :

$\frac{168 \times -5}{-294 \times -5} = -840/1470$ (Multiplying the numerator and denominator by -5)

Q 8 . Write $\frac{-14}{42}$ in a form so that numerator is equal to :

(i) -2

(ii) 7

(iii) 42

(iv) -70

SOLUTION :

Rational number with numerator :

(i) -2 is :

$$-14/7 \text{ \& } 42/7 = -26 \text{ (Dividing numerator and denominator by 7)}$$

(ii) 7 is :

$$-14/-2 \text{ \& } 42/-2 = 7/-21 \text{ (Dividing numerator and denominator by -2)}$$

(iii) 42 is :

$$-14 \times -3 \text{ \& } 42 \times -3 = 42/-126 \text{ (Multiplying numerator and denominator by -3)}$$

(iv) -70 is :

$$-14 \times 5 \text{ \& } 42 \times 5 = -70/210 \text{ (Multiplying numerator and denominator by 5)}$$

Q 9 . Select those rational numbers which can be written as a rational number with numerator 6 :

$$\frac{1}{22} , \frac{2}{3} , \frac{3}{4} , \frac{4}{-5} , \frac{5}{6} , \frac{-6}{7} , \frac{-7}{8}$$

SOLUTION :

Given rational numbers that can be written as a rational number with numerator 6 are :

$$1/22 \text{ (On multiplying by 6) } = 6/132 , 2/3 \text{ (On multiplying by 3) } = 6/9 , 3/4 \text{ (On multiplying by 2) } = 6/8 , \\ -6/7 \text{ (On multiplying by -1) } = 6/-7$$

Q 10 . Select those rational numbers which can be written as a rational number with denominator 4 :

$$\frac{7}{8}, \frac{64}{16}, \frac{36}{-12}, \frac{-16}{17}, \frac{5}{-4}, \frac{-140}{28}.$$

SOLUTION :

Given rational numbers that can be written as a rational number with denominator 4 are :

$$7/8 \text{ (On dividing by 2) } = 3.5/4,$$

$$64/16 \text{ (On dividing by 4) } = 16/4,$$

$$36/-12 \text{ (On dividing by 3) } = 12/-4 = -12/4,$$

16/17 can't be expressed with a denominator 4.

$$5/-4 \text{ (On multiplying by -1) } = -5/4$$

$$140/28 \text{ (On dividing by 7) } = 20/4$$

Q 11 . In each of the following , find an equivalent form of the rational number having common denominator :

(i) $\frac{3}{4}$ and $\frac{5}{12}$

(ii) $\frac{2}{3}$, $\frac{7}{6}$ and $\frac{11}{12}$

(iii) $\frac{5}{7}$, $\frac{3}{8}$, $\frac{9}{14}$ and $\frac{20}{21}$

SOLUTION :

Equivalent forms of the rational number having common denominator are :

(i) $3/4 = (3 \times 3)/(4 \times 3) = 9/12$ and $5/12$.

(ii) $2/3 = (2 \times 4)/(3 \times 4) = 8/12$ and $7/6 = (7 \times 2)/(6 \times 2) = 14/12$ and $11/12$

Forms are $8/12$, $14/12$ and $11/12$

(iii) $5/7 = (5 \times 24)/(7 \times 24) = 120/168$, $3/8 = (3 \times 21)/(8 \times 21) = 63/168$, $9/14 = (9 \times 12)/(14 \times 12) = 108/168$ and $20/21 = (20 \times 8)/(21 \times 8) = 160/168$

Forms are $120/168$, $63/168$, $108/168$ and $160/168$.

Exercise 4.3

Q 1 . Determine whether the following rational numbers are in the lowest form or not :

(i) $\frac{65}{84}$

(ii) $\frac{-15}{32}$

(iii) $\frac{24}{128}$

(iv) $\frac{-56}{-32}$

SOLUTION :

(i) We observe that 65 and 84 have no common factor their HCF is 1 .

Thus , $65/84$ is in its lowest form .

(ii) We observe that -15 and 32 have no common factor i.e., their HCF is 1 .

Thus , $-15/32$ is in its lowest form .

(iii) HCF of 24 and 128 is not 1 .

Thus , given rational number is not in its simplest form .

(iv) HCF of 56 and 32 is 8 .

Thus , given rational number is not in its simplest form .

Q 2 . Express each of the following numbers to the lowest form :

(i) $\frac{4}{22}$

(ii) $\frac{-36}{180}$

(iii) $\frac{132}{428}$

(iv) $\frac{-32}{-56}$

SOLUTION :

Lowest form of :

(i) $4/22$ is :

$$4 = 2 \times 2, 22 = 2 \times 11$$

HCF of 4 and 22 is 2 .

Dividing the fraction by 2 , we get $2/11$.

(ii) $-36/180$ is :

$$36 = 3 \times 3 \times 2 \times 2, 180 = 5 \times 3 \times 3 \times 2 \times 2$$

HCF of 36 and 180 is 36 .

Dividing the fraction by 36 , we get $-1/5$.

(iii) $132/-428$ is :

$$132 = 2 \times 3 \times 2 \times 11, 428 = 2 \times 2 \times 107$$

HCF of 132 and 428 is 4 .

Dividing the fraction by 4 , we get $33/-107$.

(iv) $-32/-56$ is :

$$32 = 2 \times 2 \times 2 \times 2 \times 2, 56 = 2 \times 2 \times 2 \times 7$$

HCF of 32 and 56 is 8 .

Dividing the fraction by 8 , we get $4/7$.

Q 3. Fill in the blanks :

$$(i) \frac{-5}{7} = \frac{\underline{\hspace{1cm}}}{35} = \frac{\underline{\hspace{1cm}}}{49}$$

$$(ii) \frac{-4}{-9} = \frac{\underline{\hspace{1cm}}}{18} = \frac{12}{\underline{\hspace{1cm}}}$$

$$(iii) \frac{6}{-13} = \frac{-12}{\underline{\hspace{1cm}}} = \frac{24}{\underline{\hspace{1cm}}}$$

$$(iv) \frac{-6}{\underline{\hspace{1cm}}} = \frac{3}{11} = \frac{\underline{\hspace{1cm}}}{-55}$$

SOLUTION :

(i) Here , $(-5 \times 5)/(7 \times 5) = -25/35$

Also , $(-5 \times 7)/(7 \times 7) = -35/49$.

Therefore , $-5/7 = -25/35 = -35/49$

(ii) Here, $(-4 \times 2)/(-9 \times 2) = 8/18$

Also , $(-4 \times 3)/(-9 \times 3) = 12/27$

Therefore , $-4/-9 = 8/18 = 12/27$

(iii) Here , $(6 \times 2)/(-13 \times 2) = -12/26$

Also , $(6 \times 4)/(-13 \times 4) = 24/-52$

Therefore , $6/-13 = -12/26 = 24/-52$

(iv) Here , $(-6 \times 2)/(-22 \times 2) = 3/11$

Also , $-6/-22 = (3 \times 5)/(11 \times 5) = 15/55$

Therefore , $-6/-22 = 3/11 = 15/55$

Exercise 4.4

Q 1 .Write each of the following rational numbers in the standard form :

(i) $2/10$

(ii) $-8/36$

(iii) $4/-16$

(iv) . $-15/-35$

(v) $299/-161$

(vi) $-63/-210$

(vii) $68/-119$

(viii) $-195/275$

SOLUTION :

(i) The denominator is positive and HCF of 2 and 10 is 2 .

Therefore , Dividing the numerator and denominator by 2 , we get :

$$2/10 = 2/2 , 10/2 = 1/5$$

(ii) The denominator is positive and HCF of 8 and 36 is 4 .

Therefore , Dividing the numerator and denominator by 4 , we get : $-8/36 = -8/4 , 36/4 = -2/9$

(iii) The denominator is negative .

$$(4x-1)/(-16x-1) = -4/16$$

HCF of 4 and 16 is 4.

Therefore , Dividing the numerator and denominator by 4 , we get : $-4/4 , 16/4 = -1/4$

$$\textcircled{iv} \quad \frac{-15}{-35}$$

The H.C.F of 15 and 35 is 5.

Dividing the Nr and Dr of $\frac{-15}{-35}$ by 5, we get

$$\frac{-15 \div 5}{-35 \div 5} = \frac{3}{7}$$

$$\textcircled{v} \quad \frac{299}{-161}$$

The H.C.F of 299 and 161 is 23.

Dividing the Nr and Dr of $\frac{299}{-161}$ by 23, we get

$$\frac{299}{-161} = \frac{299 \div 23}{-161 \div 23} = \frac{13}{-7}$$

$$\textcircled{vi} \quad \frac{-63}{-210}$$

The H.C.F of 63 and 210 is 21.

Dividing the Nr and Dr of $\frac{-63}{-210}$ by 21, we get

$$\frac{-63}{-210} = \frac{-63 \div 21}{-210 \div 21} = \frac{-3}{-10} = \frac{3}{10}$$

$$\textcircled{vii} \quad \frac{68}{-119}$$

The H.C.F of 68 and 119 is 17.

Dividing the Nr and Dr of $\frac{68}{-119}$ by 17, we get

$$\frac{68}{-119} = \frac{68 \div 17}{-119 \div 17} = \frac{4}{-7}$$

$$\textcircled{viii} \quad \frac{-195}{275}$$

The H.C.F of 195 and 275 is 5, we get

$$\frac{-195}{275} = \frac{-195 \div 5}{275 \div 5} = \frac{-39}{55}$$

Exercise 4.5

Q 1 .Which of the following numbers are equal ?

(i) . $-9/12$ and $8/-12$

(ii) . $-16/20$ and $20/-25$

(iii) . $-7/21$ and $3/-9$

(iv) . $-8/-14$ and $13/21$

SOLUTION :

(i) . The standard form of $-9/12$ is $-9/3$, $12/3 = -34$

The standard form of $8/-12$ is $8/-4$, $12/-4 = -2/3$

Since , the standard forms of two rational numbers are not same . Hence , they are not equal .

(ii) Since , LCM of 20 and 25 is 100 .

Therefore making the denominators equal , $-16/20 = (-16 \times 5)/(20 \times 5) = -80/100$ and $20/-25 = (-20 \times 4)/(25 \times 4) = -80/100$.

Therefore , $-16/20 = 20/-25$.

(iii) . Since , LCM of 21 and 9 is 63 .

Therefore making the denominators equal , $-7/21 = (-7 \times 3)/(21 \times 3) = -21/63$ and $3/-9 = (-3 \times 7)/(9 \times 7) = -21/63$.

Therefore , $-7/21 = 3/-9$.

(iv) . Since , LCM of 14 and 21 is 42 .

Therefore making the denominators equal , $-8/-14 = (-8 \times 3)/(-14 \times 3) = -24/-42$ and $13/21 = (13 \times 2)/(21 \times 2) = 26/42$.

Therefore , $-8/14$ is not equal to $13/21$.

Q 2 . If each of the following pairs represents a pair of equivalent rational numbers , find the values of x :

(i) . $\frac{2}{3}$ and $\frac{5}{x}$

(ii) . $-\frac{3}{7}$ and $\frac{x}{4}$

(iii) . $\frac{3}{5}$ and $\frac{x}{-25}$

(iv) . $\frac{13}{6}$ and $-\frac{65}{x}$

SOLUTION :

(i). $\frac{2}{3} = \frac{5}{x}$, then $x = \frac{5 \times 3}{2} = \frac{15}{2}$

(ii) . $-\frac{3}{7} = \frac{x}{4}$, then $x = -\frac{3}{7} \times 4 = -\frac{12}{7}$

(iii) . $\frac{3}{5} = \frac{x}{-25}$, then $x = \frac{3}{5} \times (-25) = -\frac{75}{5} = -15$

(iv) . $\frac{13}{6} = -\frac{65}{x}$, then $x = \frac{6 \times 13 \times (-65)}{13} = 6 \times (-5) = -30$

Q 3 . In each of the following , fill in the blanks so as to make the statement true:

(i) . A number which can be expressed in the form $\frac{p}{q}$, where p and q are integers and q is not equal to zero , is called a

(ii) . If the integers p and q have no common divisor other than 1 and q is positive , then the rational number $\frac{p}{q}$ is said to be in the

(iii) . Two rational numbers are said to be equal , if they have the same form .

(iv) . If m is a common divisor of a and b , then $\frac{a}{b} = \frac{a \div m}{b \div m}$

(v) . If p and q are positive Integers , then $\frac{p}{q}$ is arational number and $\frac{p}{-q}$ is a rational number .

(vi) . The standard form of -1 is ...

(vii) . If $\frac{p}{q}$ is a rational number , then q cannot be

(viii) . Two rational numbers with different numerators are equal , if their numerators are in the same as their denominators .

SOLUTION :

- (i) . rational number
- (ii) . standard rational number
- (iii) . standard form
- (iv) . $a/b = (a \div m)/(b \div m)$
- (v). positive rational number , negative rational number
- (vi) . -1/1
- (vii). Zero
- (viii). ratio

Q 4 . In each of the following state if the statement is true (T) or false (F) :

- (i) . The quotient of two integers is always an integer .*
- (ii) . Every integer is a rational number .*
- (iii) . Every rational number is an integer .*
- (iv) . Every fraction is a rational number .*
- (v) . Every rational number is a fraction .*
- (vi) . If a/b is a rational number and m any integer , then $\frac{a}{b} = \frac{a \times m}{b \times m}$.*
- (vii) . Two rational numbers with different numerators cannot be equal .*
- (viii) . 8 can be written as a rational number with any integer as denominator .*
- (ix) . 8 can be written as a rational number with any integer as numerator .*
- (x) . $2/3$ is equal to $4/6$.*

SOLUTION :

- (i) . False ; not necessary
- (ii) . True ; every integer can be expressed in the form of p/q , where q is not zero .
- (iii). False ; not necessary
- (iv) . True ; every fraction can be expressed in the form of p/q , where q is not zero .
- (v) . False ; not necessary
- (vi) . True
- (vii) . False ; they can be equal , when simplified further .
- (viii) . False
- (ix) . False
- (x). True ; in the standard form , they are equal .

Exercise 4.6

Q 1 . Draw the number line and represent the following rational numbers on it :

(i) $\frac{2}{3}$

(ii) $\frac{3}{4}$

(iii) $\frac{3}{8}$

(iv) $-\frac{5}{8}$

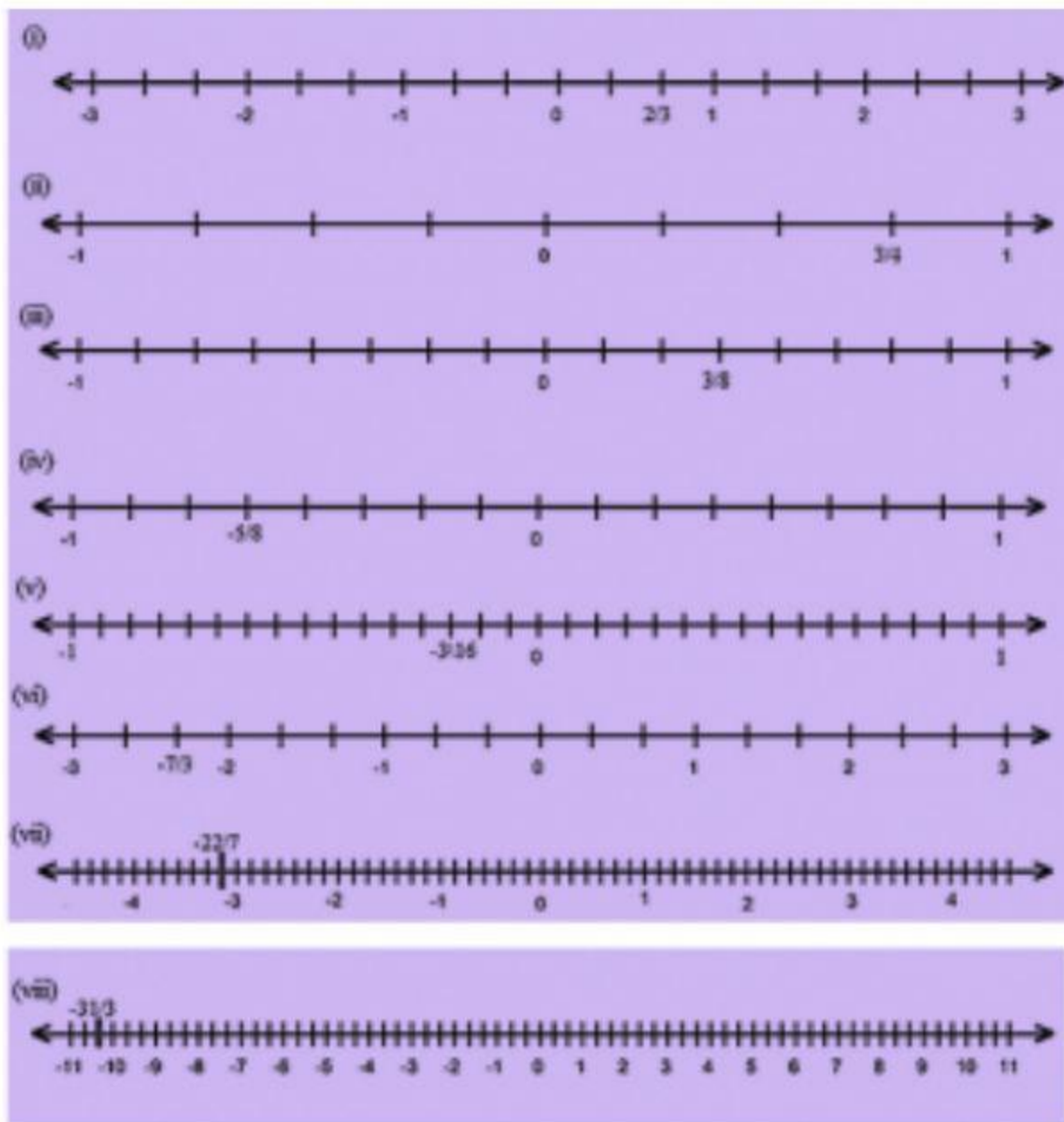
(v) $-\frac{3}{16}$

(vi) $-\frac{7}{3}$

(vii) $\frac{22}{-7}$

(viii) $-\frac{31}{3}$

SOLUTION :



Q 2 . Which of the two rational numbers in each of the following pairs of rational numbers is greater ?

(i) $-3/8, 0$

(ii) $5/2, 0$

(iii) $-4/11, 3/11$

(iv) $-7/12, 5/-8$

(v) $4/9, -3/-7$

(vi) $-5/8, 3/-4$

(vii) $5/9, -3/-8$

(viii) $5/-8, -7/12$

SOLUTION :

(i) We know that every positive rational number is greater than zero and every negative rational number is smaller than zero . Thus , $-3/8 > 0$

(ii) $5/2 > 0$. Because every positive rational number is greater than zero and every negative rational number is smaller than zero .

(iii) $-4/11 < 3/11$. Because every positive rational number is greater than zero and every negative rational number is smaller than zero .

(iv) $-7/12 = (-7 \times 2)/(12 \times 2) = -14/24$ and $5/-8 = (-5 \times 3)/(8 \times 3) = -15/24$

Therefore $-7/12 > 5/-8$

(v) $4/-9 = (-4 \times 7)/(9 \times 7) = -28/63$ and $-3/-7 = (3 \times 7)/(7 \times 9) = 21/63$

Therefore , $4/-9 < -3/-7$

(vi) $-5/8$ and $3/-4 = (-3 \times 2)/(4 \times 2) = -6/8$

Therefore , $-5/8 > 3/-4$

(vii) $5/9 = (5 \times 8)/(9 \times 8) = 40/72$ and $-3/-8 = (3 \times 9)/(8 \times 9) = 27/72$

Therefore , $5/9 > -3/-8$

(viii) $-7/12 = (-7 \times 2)/(12 \times 2) = -14/24$ and $5/-8 = (-5 \times 3)/(8 \times 3) = -15/24$

Therefore , $7/12 > 5/-8$

Q 3. Fill in the blanks by the correct symbol out $>$, $=$, or $<$:

(i) $\frac{-6}{-13}$, $\frac{7}{13}$

(ii) $\frac{16}{-5}$, 3

(iii) $\frac{-4}{3}$, $\frac{8}{-7}$

(iv) $\frac{-12}{5}$, -3

SOLUTION :

(i) $-6/-13 = 6/13 < 7/13$

(ii) $16/-5 < 3$

(iii) $-4/3 = (-4 \times 7)/(3 \times 7) = -28/21$ and $8/-7 = (-8 \times 3)/(7 \times 3) = -24/21$

Therefore, $-4/3 < 8/-7$

(iv) $-12/5$ and $-3 = (-3 \times 5)/(1 \times 5) = -15/5$

Therefore $-12/5 > -3$

Q 4. Fill in the blanks by the correct symbol out of $>$, $=$, or $<$:

(i) $\frac{6}{7}$ $\frac{7}{13}$

(ii) $\frac{-3}{5}$ $\frac{-5}{6}$

(iii) $\frac{2}{3}$ $\frac{5}{-8}$

(iv) 0 $\frac{-2}{5}$

SOLUTION :

(i) Because every positive number is greater than a negative number, $-6/7 < 7/13$.

(ii) On multiplying $-3/5$ by $6/6$, we get $-18/30$.

On multiplying $-5/6$ by $5/5$, we get $-25/30$.

Because $-18 > -25$, $-35 > -56$

(iii) On multiplying $-2/3$ by $8/8$, we get $-16/24$.

On multiplying $5/-8$ by $3/3$, we get $15/-24 = -15/24$.

Because $-15 > -16$, $-2/3 < 5/-8$.

(iv) Because every positive number is greater than a negative number, $0 > -2/5$.

Q 5 . Arrange the following rational numbers in ascending order :

(i) $\frac{3}{5}, \frac{-17}{-30}, \frac{8}{-15}, \frac{-7}{10}$

(ii) $\frac{-4}{9}, \frac{5}{-12}, \frac{7}{-18}, \frac{2}{-3}$

SOLUTION :

(i) Ascending order:

Since , LCM of 5 , -30 , -15 , 10 is 30 .

Multiplying the numerators and denominators to get the denominator equal to the LCM $\frac{3}{5} = \frac{(3 \times 6)}{(5 \times 6)} = \frac{18}{30}$, $\frac{17}{30} = \frac{(17 \times 1)}{(30 \times 1)} = \frac{17}{30}$, $\frac{8}{-15} = \frac{(-8 \times 2)}{(15 \times 2)} = \frac{-16}{30}$, $\frac{-7}{10} = \frac{(-7 \times 3)}{(10 \times 3)} = \frac{-21}{30}$.

Order is $-21 < -16 < 17 < 18$.

Order is $\frac{-7}{10} < \frac{8}{-15} < \frac{17}{30} < \frac{3}{5}$.

(ii) Since , LCM of 9 , -12 , -18 , 3 is 36 .

Multiplying the numerators and denominators to get the denominator to get the denominator equal to the LCM ,

$\frac{-4}{9} = \frac{(-4 \times 4)}{(9 \times 4)} = \frac{-16}{36}$, $\frac{5}{-12} = \frac{(-5 \times 3)}{(12 \times 3)} = \frac{-15}{36}$, $\frac{7}{-18} = \frac{(-7 \times 2)}{(8 \times 2)} = \frac{-14}{36}$, $\frac{2}{-3} = \frac{(-2 \times 12)}{(3 \times 12)} = \frac{-24}{36}$.

Order is $-24 < -16 < -15 < -14$. Order is $\frac{2}{-3} < \frac{-4}{9} < \frac{5}{-12} < \frac{7}{-18}$.

Q 6 . Arrange the following rational numbers in descending order :

(i) $\frac{7}{8}, \frac{64}{16}, \frac{36}{-12}, \frac{5}{-4}, \frac{140}{28}$

(ii) $\frac{-3}{10}, \frac{17}{-30}, \frac{7}{-15}, \frac{-11}{20}$

SOLUTION :

We have to arrange them in descending order.

(i) Since , LCM of 8 , 16 , -12 , -4 , 28 is 336 .

Multiplying the numerators and denominators , to get the denominator equal to the LCM , $7/8 = (7 \times 42)/(8 \times 42) = 294/336$, $64/16 = (64 \times 21)/(16 \times 21) = 1344/336$, $36/-12 = (-36 \times 28)/(12 \times 28) = -1008/336$, $5/-4 = (-5 \times 84)/(4 \times 84) = -420/336$, $140/28 = (140 \times 12)/(28 \times 12) = 1680/336$.

Order is $1680 > 1344 > 294 > -420 > -1008$. Order is $4 > 36 > 12$.

Order is $140/28 > 64/16 > 7/8 > 5/-4 > 36/-12$

(ii) Since , LCM of 10 , -30 , -15 , 20 is 60 .

Multiplying the numerators and denominators , to get the denominator equal to LCM ,

$-3/10 = (-3 \times 6)/(10 \times 6) = -18/60$, $17/-30 = (-17 \times 2)/(30 \times 2) = -34/60$, $7/-15 = (-7 \times 4)/(15 \times 4) = -28/60$, $-11/20 = (-11 \times 3)/(20 \times 3) = -33/60$.

Order is, $-18 > -28 > -33 > -34$.

Order is $-3/10 > 7/-15 > -11/20 > 17/-30$.

Q 7 . Which of the following statements are true :

(i) The rational number $\frac{29}{23}$ lies to the left of zero on the number line .

(ii) The rational number $\frac{-12}{-17}$ lies to the left of zero on the number line .

(iii) The rational number $\frac{3}{4}$ lies to the right of zero on the number line .

(iv) The rational number $\frac{-12}{-5}$ and $\frac{-7}{-17}$ are on the opposite side of zero on the number line .

(v) The rational number $\frac{-21}{5}$ and $\frac{7}{-31}$ are on the opposite side of zero on the number line .

(vi) The rational number $\frac{-3}{-5}$ is on the right of $\frac{-4}{7}$ on the number line .

SOLUTION :

(i) False ; it lies to the right of zero because it is a positive number .

(ii) False ; it lies to the right of zero because it is a positive number .

(iii) True

(iv) True ; they are of opposite signs .

(v) False ; they both are of same signs .

(vi) True ; they both are of opposite signs and positive number is greater than the negative number.
Thus , it is on the right of the negative number .