Question:1

Add the following rational numbers:

i $\frac{-5}{7}$ and $\frac{3}{7}$

ii $\frac{-15}{4}$ and $\frac{7}{4}$

iii $\frac{-8}{11}$ and $\frac{-4}{11}$

iv $\frac{6}{13}$ and $\frac{-9}{13}$

Solution:

$\left(\text{i}\right)$ $\frac{-5}{7} + \frac{3}{7}$ $=$ $\frac{-5+3}{7}$ $=$ $\frac{-2}{7}$ $\left(\text{ii}\right)$ $\frac{-15}{4} + \frac{7}{4}$ $=$ $\frac{-15+7}{4}$ $=$ $\frac{-8}{4}$ $=$ -2 $\left(\text{iii}\right)$ $\frac{-8}{11} + \frac{-4}{11}$ $=$ $\frac{-8-4}{11}$ $=$ $\frac{-12}{11}$ $\left(\text{iv}\right)$ $\frac{6}{13} + \frac{-9}{13}$ $=$ $\frac{6-9}{13}$ $=$ $\frac{-3}{13}$

Question:2

i $\frac{3}{4}$ and $\frac{-3}{5}$

ii -3 and $\frac{3}{5}$

iii $\frac{-7}{27}$ and $\frac{11}{18}$

iv $\frac{31}{-4}$ and $\frac{-5}{8}$

Solution:

i

$\frac{3}{4} + \frac{-3}{5}$ LCM of the denominators 4 and 5 is 20. Now, we express $\frac{3}{4}$ and $\frac{-3}{5}$ into forms in which both of them have the same denominator 20.

ii

$-3 + \frac{3}{5}$ LCM of the denominators 1 and 5 is 5. Now, we express -3 and $\frac{3}{5}$ into forms in which both of them have the same denominator 5. $\frac{-3}{1}$

iii

$\frac{-7}{27} + \frac{11}{18}$ LCM of the denominators 27 and 18 is 54. Now, we express $\frac{-7}{27}$ and $\frac{11}{18}$ into forms in which both of them have the same denomiator 5

iv

$\frac{-31}{4} + \frac{-5}{8}$ LCM of the denominators 4 and 8 is 8. Now, we express $\frac{-31}{4}$ and $\frac{-5}{8}$ into forms in which both of them have the same denomiator 8.

Question:3

Simplify:

i $\frac{8}{9} + \frac{-11}{6}$

ii $\frac{-5}{16} + \frac{7}{24}$

iii $\frac{1}{-12} + \frac{2}{-15}$

iv $\frac{-8}{19} + \frac{-4}{57}$

Solution:

$\left(\text{i}\right)$ $\frac{8}{9} + \frac{-11}{6}$ LCM of the denominators 9 and 6 is 18. Now, we express $\frac{8}{9}$ and $\frac{-11}{6}$ into forms in which both of them have the same denominato

$\left(\text{ii}\right)$ $\frac{-5}{16} + \frac{7}{24}$ LCM of the denominators 16 and 24 is 48. Now, we express $\frac{-5}{16}$ and $\frac{7}{24}$ into forms in which both of them have the same denomin

$\left(\text{iv}\right)$ $\frac{-8}{19} + \frac{-4}{57}$ LCM of the denominators 19 and 57 is 57. Now, we express $\frac{-8}{19}$ and $\frac{-4}{57}$ into forms in which both of them have the same denomi

Question:4

Add and express the sum as a mixed fraction:

i $\frac{-12}{5} + \frac{43}{10}$

ii $\frac{24}{7} + \frac{-11}{4}$

iii $\frac{-31}{6} + \frac{-27}{8}$

Solution:

$\left(\text{i}\right)$ $\frac{-12}{5} + \frac{43}{10}$ LCM of the denominators 5 and 10 is 10. Now, we express $\frac{-12}{5}$ and $\frac{43}{10}$ into forms in which both of them have the same denomina

$\left(\text{iii}\right)$ $\frac{-31}{6} + \frac{-27}{8}$ LCM of the denominators 6 and 8 is 24. Now, we express $\frac{-31}{6}$ and $\frac{-27}{8}$ into forms in which both of them have the same denom

Question:5

Subtract the first rational number from the second in each of the following:

i $\frac{3}{8}$, $\frac{5}{8}$

$ii \frac{-7}{9}, \frac{4}{9}$

$iii \frac{-2}{11}, \frac{-9}{11}$

$iv \frac{11}{13}, \frac{-4}{13}$

Solution:

$\left(\text{i}\right) \frac{5}{8} - \frac{3}{8} = \frac{2}{8}$ (ii) $\frac{4}{9} - \frac{-7}{9} = \frac{11}{9}$

$\left(\text{iii}\right) \frac{-9}{11} - \frac{-2}{11} = \frac{-9+2}{11} = \frac{-7}{11}$ (iv) $\frac{-4}{13} - \frac{11}{13} = \frac{-4-11}{13} = \frac{-15}{13}$

Question:6

Evaluate each of the following:

$i \frac{2}{3} - \frac{3}{5}$

$ii -\frac{4}{7} - \frac{2}{-3}$

$iii \frac{4}{7} - \frac{-5}{-7}$

$iv -2 - \frac{5}{9}$

Solution:

$\left(\text{i}\right) \frac{2}{3} - \frac{3}{5} = \frac{2\times5-3\times3}{15} = \frac{10-9}{15} = \frac{1}{15}$ (ii) $-\frac{4}{7} - \frac{2}{-3} = \frac{-4\times3+2\times7}{21} = \frac{-12+14}{21} = \frac{2}{21}$

$\left(\text{iii}\right) \frac{4}{7} - \frac{-5}{-7} = \frac{4-5}{7} = \frac{-1}{7}$ (iv) $-\frac{2}{1} - \frac{5}{9} = \frac{-2\times9-5}{9} = \frac{-18-5}{9} = \frac{-23}{9}$

Question:7

The sum of the two numbers is $\frac{5}{9}$. If one of the numbers is $\frac{1}{3}$, find the other.

Solution:

First number = $\frac{1}{3}$

Let the second number = *x*.

According to the question, we have

$\frac{1}{3} + x = \frac{5}{9} \Rightarrow x = \frac{5}{9} - \frac{1}{3} = \frac{5-1\times3}{9} = \frac{5-3}{9} = \frac{2}{9}$

Question:8

The sum of two numbers is $\frac{-1}{3}$. If one of the numbers is $\frac{-12}{3}$, find the other.

Solution:

First number = $\frac{-12}{3}$

Let the second number = x.

Then, according to the question, we have

$\frac{-12}{3} + x = \frac{-1}{3} \Rightarrow x = \frac{-1}{3} - \frac{-12}{3} = \frac{-1+12}{3} = \frac{11}{3}$

Question:9

The sum of two numbers is $\frac{-4}{3}$. If one of the numbers is –5, find the other.

Solution:

First number = -5

Let the second number = x.

Then, according to the question, we have

$-5 + x = \frac{-4}{3} \Rightarrow x = \frac{-4}{3} - \frac{-5}{1} = \frac{-4+5\times3}{3} = \frac{-4+15}{3} = \frac{11}{3}$

Question:10

The sum of two rational numbers is –8. If one of the numbers is $\frac{-15}{7}$, find the other.

Solution:

First number = $\frac{-15}{7}$

Let the second number = *x*.

Then, according to the question, we have

$\frac{-15}{7} + x = -8 \Rightarrow x = \frac{-8}{1} - \frac{-15}{7} = \frac{-8\times7+15}{7} = \frac{-56+15}{7} = \frac{-41}{7}$

Question:11

What should be added to $\frac{-7}{8}$ so as to get $\frac{5}{9}$?

Solution:

Let *x* be added to $\frac{-7}{8}$ to get $\frac{5}{9}$.

Then, according to the question, we have

$x + \frac{-7}{8} = \frac{5}{9} => x = \frac{5}{9} - \frac{-7}{8} = \frac{5\times8+7\times9}{72} = \frac{40+63}{72} = \frac{103}{72}$

Question:12

What number should be added to $\frac{-5}{11}$ so as to get $\frac{26}{33}$?

Solution:

Let x be added to $\frac{-5}{11}$ to get $\frac{26}{33}$.

Then, according to the question, we have

$x + \frac{-5}{11} = \frac{26}{33} => x = \frac{26}{33} - \frac{-5}{11}$ $= \frac{26+5\times3}{33}$ $= \frac{26+15}{33}$ $= \frac{41}{33}$

Question:13

What number should be added to $\frac{-5}{7}$ to get $\frac{-2}{3}$?

Solution:

Let x be added to $\frac{-5}{7}$ to get $\frac{-2}{3}$.

Then, according to the question, we have

$x + \frac{-5}{7} = \frac{-2}{3} \Rightarrow x = \frac{-2}{3} - \frac{-5}{7} = \frac{-2\times7+5\times3}{21} = \frac{-14+15}{21} = \frac{1}{21}$

Question:14

What number should be suvtracted from $\frac{-5}{3}$ to get $\frac{5}{6}$?

Solution:

Let x be the number that should be subtracted from $\frac{-5}{3}$ to get $\frac{5}{6}$.

Then, according to the question, we have

$\frac{-5}{3} - x = \frac{5}{6} \Rightarrow x = \frac{-5}{3} - \frac{5}{6} = \frac{-5\times2}{3\times2} - \frac{5}{6} = \frac{-10-5}{6} = \frac{-15}{6} = \frac{-5}{2}$

Question:15

What number should be subtracted from $\frac{3}{7}$ to get $\frac{5}{4}$?

Solution:

Let x be the number that should be subtracted from $\frac{3}{7}$ to get $\frac{5}{4}$.

Then, according to the question, we have

$\frac{3}{7} - x = \frac{5}{4} \Rightarrow x = \frac{3}{7} - \frac{5}{4} = \frac{3\times4-5\times7}{28} = \frac{12-35}{28} = \frac{-23}{28}$

Question:16

What should be added to $\left(\frac{2}{3} + \frac{3}{5}\right)$ to get $\frac{-2}{15}$?

Solution:

$\frac{2}{3} + \frac{3}{5} = \frac{2\times5}{3\times5} + \frac{3\times3}{5\times3} = \frac{10}{15} + \frac{9}{15} = \frac{19}{15}$

Let x be the number that should be added to $\frac{19}{15}$ to get $\frac{-2}{15}$

Then, we have

$\frac{19}{15} + x = \frac{-2}{15} => x = \frac{-2}{15} - \frac{19}{15}$ $= \frac{-21}{15}$ $= \frac{-7\times3}{5\times3}$ $= \frac{-7}{5}$

Question:17

What should be added to $\left(\frac{1}{2} + \frac{1}{3} + \frac{1}{5}\right)$ to get 3?

Solution:

Let x be added to $\left(\frac{1}{2} + \frac{1}{3} + \frac{1}{5}\right) = \left(\frac{1\times15}{2\times15} + \frac{1\times10}{3\times10} + \frac{1\times6}{5\times6}\right) = \left(\frac{15}{30} + \frac{10}{30} + \frac{6}{30}\right) = \frac{31}{30}$ to get 3.

Then, we have

$\frac{31}{30} + x = 3 \Rightarrow x = 3 - \frac{31}{30} = \frac{3\times30}{1\times30} - \frac{31}{30} = \frac{90}{30} - \frac{31}{30} = \frac{59}{30}$

Question:18

What should be subtracted from $\left(\frac{3}{4} - \frac{2}{3}\right)$ to get $\frac{-1}{6}$?

Solution:

Let x be the number that should be subtracted from $\frac{3}{4} - \frac{2}{3} = \frac{3\times3}{4\times3} - \frac{2\times4}{3\times4} = \frac{9}{12} - \frac{8}{12} = \frac{1}{12}$ to get $\frac{-1}{6}$.

Then, we have

$\frac{1}{12} - x = \frac{-1}{6} \Rightarrow x = \frac{1}{12} - \frac{-1}{6} = \frac{1}{12} - \frac{-1\times2}{6\times2} = \frac{1}{12} - \frac{-2}{12} = \frac{3}{12} = \frac{1}{4}$

Question:19

Simplify:

i $\frac{-3}{2} + \frac{5}{4} - \frac{7}{4}$

ii $\frac{5}{3} - \frac{7}{6} + \frac{-2}{3}$

iii $\frac{5}{4} - \frac{7}{6} - \frac{-2}{3}$

iv $\frac{-2}{5} - \frac{-3}{10} - \frac{-4}{7}$

Solution:

$\left(i\right)$ $\frac{-3}{2} + \frac{5}{4} - \frac{7}{4} = \frac{-3 \times 2}{2 \times 2} + \frac{5}{4} - \frac{7}{4} = \frac{-6 + 5 - 7}{4} = \frac{-8}{4} = -2$ $\left(ii\right)$ $\frac{5}{3} - \frac{7}{6} + \frac{-2}{3} = \frac{5 \times 2}{3 \times 2} - \frac{7}{6} + \frac{-2 \times 2}{3 \times 2} = \frac{10 - 7 - 4}{6} = \frac{-1}{6}$

$\left(iii\right)$ $\frac{5}{4} - \frac{7}{6} - \frac{-2}{3} = \frac{5 \times 3}{4 \times 3} - \frac{7 \times 2}{6 \times 2} - \frac{-2 \times 4}{3 \times 4} = \frac{15 - 14 + 8}{12} = \frac{9}{12} = \frac{3}{4}$ $\left(iv\right)$ $\frac{-2}{5} - \frac{-3}{10} - \frac{-4}{7} = \frac{-2 \times 14}{5 \times 14} - \frac{-3 \times 7}{10 \times 7} - \frac{-4 \times 10}{7 \times 10} = \frac{-28 + 21 + 40}{70} = \frac{33}{70}$

Question:20

Fill in the blanks:

i $\frac{-4}{13} - \frac{-3}{26} = \ldots$

ii $\frac{-9}{14} + \ldots = -1$

iii

iv

Solution:

i

iv

Question:21

Multiply:

i

ii

iii

iv

Solution:

Question:22

Multiply:

i

ii

iii

iv

Solution:

i

ii

iv

Question:23

Simplify peach of the following and express the result as a rational number in standard from:

i

ii

iii

iv

Solution:

iii $\frac{5}{4} - \frac{7}{6} - \frac{-2}{3}$

iv $\frac{-2}{5} - \frac{-3}{10} - \frac{-4}{7}$

Question:24

Simplify:

i

ii

Solution:

Question:25
Divide:
i

ii

iii

iv

v

vi

vii

viii

Solution:

Question:26
Find the value and express as a rational number in standard form:

i

ii

iii

iv

Solution:

$(i) \dfrac{2}{5} \div \dfrac{26}{15} = \dfrac{2}{5} \times \dfrac{15}{26} = \dfrac{2}{5} \times \dfrac{3 \times 5}{2 \times 13} = \dfrac{3}{13}$

$(ii) \dfrac{10}{3} \div \dfrac{-35}{12} = \dfrac{10}{3} \times \dfrac{-12}{35} = \dfrac{2 \times 5}{3} \times \dfrac{-3 \times 4}{5 \times 7} = \dfrac{-8}{7}$

$(iii) -6 \div \dfrac{-8}{17} = -6 \times \dfrac{-17}{8} = -2 \times 3 \times \dfrac{-17}{2 \times 4} = \dfrac{51}{4}$

$(iv) \dfrac{40}{98} \div -20 = \dfrac{40}{98} \times \dfrac{1}{-20} = \dfrac{2 \times 20}{2 \times 49} \times \dfrac{-1}{20} = \dfrac{-1}{49}$

Question:27
The product of two rational numbers is 15. If one of the numbers is –10, find the other.
Solution:
Let the first rational number = *x*.
Second number = –10
Their product = 15

Then, we have

Question:28
The product of two rational numbers is . If one of the numbers is , find the other.
Solution:
Let the first rational number = *x*
Second number   =
Their product   =

Then, we have

Question:29
By what number should we multiply so that the product may be ?
Solution:
Let *x* be the number by which we should multiply
Then, according to the question, we have

Question:30

Simplify:

i

ii

Solution:

Question:31

By what number should we multiply so that the product may be ?

Solution:

Let x be the number by which we multiply

Then, we have

Question:32

By what number should we multiply so that the product may be 24?

Solution:

Let x be the number required. Then, we have

Question:33

By what number should be multiplied in order to produce

Solution:

Let x be the number by which we should multiply

Then, we have

Question:34

Find $(x + y) \div (x + y)$, if

i

ii

iii

Solution:

i $x =$

Then, $(x+y)$ =

Then, .

ii $x =$

Then, $(x+y)$ =

Then,

iii $x =$

Then, $(x+y)$ =

Then,

Question:35

The cost of metres of rope is Rs . Find its cost per metre.

Solution:

The cost of   of rope = Rs. .

Then, the cost of 1 metre of rope = Rs.

Question:36

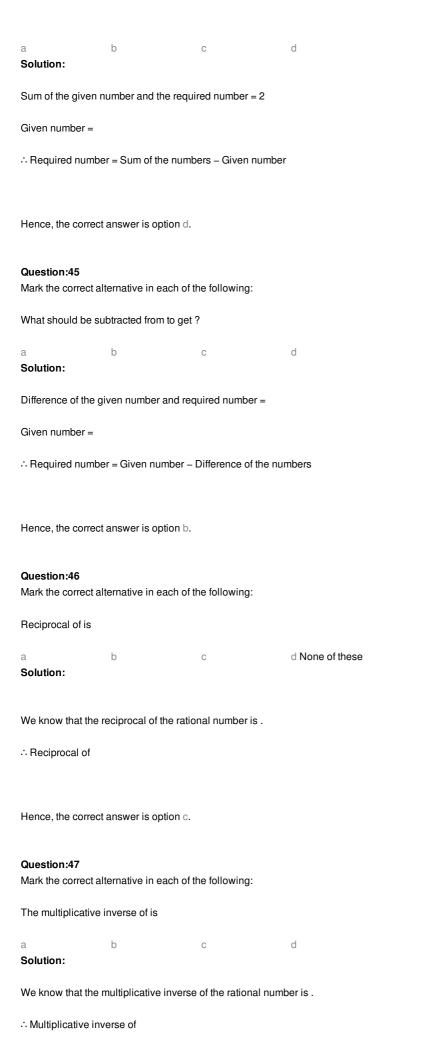The cost of metres of cloth is Rs . Find the cost of cloth per metre.

Solution:

The cost of = .

The cost of 1 metre of cloth = Rs.

Question:37

By what number should be divided to got ?

Solution:

Let x be the number required.

Then, we have

Question:38

Divide the sum of and by the product of

Solution:

Then, according to the question, we have

Question:39

Divide the sum of and by their difference.

Solution:

According to the question, we need to divide the first figure by the second:

Question:40

If 24 trousers of equal size can be prepared in 54 metres of cloth, what length of cloth is required for each trouser?

Solution:

Total cloth given = 54 metres

Total number of pairs of trousers made = 24

Length of cloth required for each pair of trousers =

Question:41

Find six rational numbers between and .

Solution:

Question:42

Find 10 rational numbers between and .

Solution:

Since

Question:43

State true or false:

i Between any two distinect integers there is always an linteger.

ii Between any two distinct rational numbers there is always a rational number.

iii Between any two distinct rational numbers there is always a rational number.

Solution:

i False, because there is no integer between 2 and 3.

ii True

iii True

Question:44

Mark the correct alternative in each of the following:

What should be added to to get 2?

a	b	c	d

Solution:

Sum of the given number and the required number = 2

Given number =

∴ Required number = Sum of the numbers – Given number

Hence, the correct answer is option d.

Question:45

Mark the correct alternative in each of the following:

What should be subtracted from to get ?

a	b	c	d

Solution:

Difference of the given number and required number =

Given number =

∴ Required number = Given number – Difference of the numbers

Hence, the correct answer is option b.

Question:46

Mark the correct alternative in each of the following:

Reciprocal of is

a	b	c	d None of these

Solution:

We know that the reciprocal of the rational number is .

∴ Reciprocal of

Hence, the correct answer is option c.

Question:47

Mark the correct alternative in each of the following:

The multiplicative inverse of is

a	b	c	d

Solution:

We know that the multiplicative inverse of the rational number is .

∴ Multiplicative inverse of

Hence, the correct answer is option c.

Question:48

Mark the correct alternative in each of the following:

a   b   c   d

Solution:

Hence, the correct answer is option d.

Question:49

Mark the correct alternative in each of the following:

a   b   c   d

Solution:

Hence, the correct answer is option b.

Question:50

Mark the correct alternative in each of the following:

a 0   b   c   d

Solution:

We know that 0 divided by any non-zero rational number is always 0.

Hence, the correct answer is option a.

Question:51

Mark the correct alternative in each of the following:

a   b   c   d

Solution:

Hence, the correct answer is option b.

Question:52

Mark the correct alternative in each of the following:

If the product of two non-zero rational numbers is 1, then they are

a additve inverse of each other   b multiplicative inverse of each other

c reciprocal of each other   d both b and c
Solution:

For every non-zero rational number there exists a rational number such that

Here, the rational number is called the multiplicative inverse or reciprocal of .

Thus, if the product of two non-zero rational numbers is 1, then they are multiplicative inverse or reciprocal of each other.

Hence, the correct answer is option d.

Question:53
Mark the correct alternative in each of the following:

The product is equal to

a   b   c   d
Solution:

Hence, the correct answer is option c.

Question:54
Mark the correct alternative in each of the following:

a   b   c   d None of these
Solution:

Hence, the correct answer is option d.

Question:55
Mark the correct alternative in each of the following:

a   b 3   c   d
Solution:

Hence, the correct answer is option b.

Question:56
Mark the correct alternative in each of the following:

a   b   c   d
Solution:

Hence, the correct answer is option c.

Question:57

Mark the correct alternative in each of the following:

If , then $x =$

a   b   c   d

Solution:

Hence, the correct answer is option b.

Question:58

Mark the correct alternative in each of the following:

a   b   c   d

Solution:

Hence, the correct answer is option a.

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