

EXERCISE 1.1

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1. Add the following rational numbers:

- (i) $-5/7$ and $3/7$
- (ii) $-15/4$ and $7/4$
- (iii) $-8/11$ and $-4/11$
- (iv) $6/13$ and $-9/13$

Solution:

Since the denominators are of same positive numbers we can add them directly

$$(i) -5/7 + 3/7 = (-5+3)/7 = -2/7$$

$$(ii) -15/4 + 7/4 = (-15+7)/4 = -8/4$$

Further dividing by 4 we get,

$$-8/4 = -2$$

$$(iii) -8/11 + -4/11 = (-8 + (-4))/11 = (-8-4)/11 = -12/11$$

$$(iv) 6/13 + -9/13 = (6 + (-9))/13 = (6-9)/13 = -3/13$$

2. Add the following rational numbers:

- (i) $3/4$ and $-5/8$

Solution: The denominators are 4 and 8

By taking LCM for 4 and 8 is 8

We rewrite the given fraction in order to get the same denominator

$$3/4 = (3 \times 2) / (4 \times 2) = 6/8 \text{ and}$$

$$-5/8 = (-5 \times 1) / (8 \times 1) = -5/8$$

Since the denominators are same we can add them directly

$$6/8 + -5/8 = (6 + (-5))/8 = (6-5)/8 = 1/8$$

- (ii) $5/-9$ and $7/3$

Solution: Firstly we need to convert the denominators to positive numbers.

$$5/-9 = (5 \times -1) / (-9 \times -1) = -5/9$$

The denominators are 9 and 3

By taking LCM for 9 and 3 is 9

We rewrite the given fraction in order to get the same denominator

$$-5/9 = (-5 \times 1) / (9 \times 1) = -5/9 \text{ and}$$

$$7/3 = (7 \times 3) / (3 \times 3) = 21/9$$

Since the denominators are same we can add them directly

$$-5/9 + 21/9 = (-5+21)/9 = 16/9$$

- (iii) -3 and $3/5$

Solution: The denominators are 1 and 5

By taking LCM for 1 and 5 is 5

We rewrite the given fraction in order to get the same denominator

$$-3/1 = (-3 \times 5) / (1 \times 5) = -15/5 \text{ and}$$

$$3/5 = (3 \times 1) / (5 \times 1) = 3/5$$

Now, the denominators are same we can add them directly

$$-15/5 + 3/5 = (-15+3)/5 = -12/5$$

(iv) $-7/27$ and $11/18$

Solution: The denominators are 27 and 18

By taking LCM for 27 and 18 is 54

We rewrite the given fraction in order to get the same denominator

$$-7/27 = (-7 \times 2) / (27 \times 2) = -14/54 \text{ and}$$

$$11/18 = (11 \times 3) / (18 \times 3) = 33/54$$

Now, the denominators are same we can add them directly

$$-14/54 + 33/54 = (-14+33)/54 = 19/54$$

(v) $31/-4$ and $-5/8$

Solution: Firstly we need to convert the denominators to positive numbers.

$$31/-4 = (31 \times -1) / (-4 \times -1) = -31/4$$

The denominators are 4 and 8

By taking LCM for 4 and 8 is 8

We rewrite the given fraction in order to get the same denominator

$$-31/4 = (-31 \times 2) / (4 \times 2) = -62/8 \text{ and}$$

$$-5/8 = (-5 \times 1) / (8 \times 1) = -5/8$$

Since the denominators are same we can add them directly

$$-62/8 + (-5)/8 = (-62 + (-5))/8 = (-62-5)/8 = -67/8$$

(vi) $5/36$ and $-7/12$

Solution: The denominators are 36 and 12

By taking LCM for 36 and 12 is 36

We rewrite the given fraction in order to get the same denominator

$$5/36 = (5 \times 1) / (36 \times 1) = 5/36 \text{ and}$$

$$-7/12 = (-7 \times 3) / (12 \times 3) = -21/36$$

Now, the denominators are same we can add them directly

$$5/36 + -21/36 = (5 + (-21))/36 = 5-21/36 = -16/36 = -4/9$$

(vii) $-5/16$ and $7/24$

Solution: The denominators are 16 and 24

By taking LCM for 16 and 24 is 48

We rewrite the given fraction in order to get the same denominator

$$-5/16 = (-5 \times 3) / (16 \times 3) = -15/48 \text{ and}$$

$$7/24 = (7 \times 2) / (24 \times 2) = 14/48$$

Now, the denominators are same we can add them directly

$$-15/48 + 14/48 = (-15 + 14)/48 = -1/48$$

(viii) $7/-18$ and $8/27$

Solution: Firstly we need to convert the denominators to positive numbers.

$$7/-18 = (7 \times -1) / (-18 \times -1) = -7/18$$

The denominators are 18 and 27

By taking LCM for 18 and 27 is 54

We rewrite the given fraction in order to get the same denominator

$$-7/18 = (-7 \times 3) / (18 \times 3) = -21/54 \text{ and}$$

$$8/27 = (8 \times 2) / (27 \times 2) = 16/54$$

Since the denominators are same we can add them directly

$$-21/54 + 16/54 = (-21 + 16)/54 = -5/54$$

3.Simplify:

(i) $8/9 + -11/6$

Solution: let us take the LCM for 9 and 6 which is 18

$$(8 \times 2) / (9 \times 2) + (-11 \times 3) / (6 \times 3)$$

$$16/18 + -33/18$$

Since the denominators are same we can add them directly

$$(16-33)/18 = -17/18$$

(ii) $3 + 5/-7$

Solution: Firstly convert the denominator to positive number

$$5/-7 = (5 \times -1) / (-7 \times -1) = -5/7$$

$$3/1 + -5/7$$

Now let us take the LCM for 1 and 7 which is 7

$$(3 \times 7) / (1 \times 7) + (-5 \times 1) / (7 \times 1)$$

$$21/7 + -5/7$$

Since the denominators are same we can add them directly

$$(21-5)/7 = 16/7$$

(iii) $1/-12 + 2/-15$

Solution: Firstly convert the denominator to positive number

$$1/-12 = (1 \times -1) / (-12 \times -1) = -1/12$$

$$2/-15 = (2 \times -1) / (-15 \times -1) = -2/15$$

$$-1/12 + -2/15$$

Now let us take the LCM for 12 and 15 which is 60

$$(-1 \times 5)/(12 \times 5) + (-2 \times 4)/(15 \times 4)$$

$$-5/60 + -8/60$$

Since the denominators are same we can add them directly

$$(-5-8)/60 = -13/60$$

(iv) $-8/19 + -4/57$

Solution: let us take the LCM for 19 and 57 which is 57

$$(-8 \times 3)/(19 \times 3) + (-4 \times 1)/(57 \times 1)$$

$$-24/57 + -4/57$$

Since the denominators are same we can add them directly

$$(-24-4)/57 = -28/57$$

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

Solution: Firstly convert the denominator to positive number

$$3/-4 = (3 \times -1)/(-4 \times -1) = -3/4$$

$$7/9 + -3/4$$

Now let us take the LCM for 9 and 4 which is 36

$$(7 \times 4)/(9 \times 4) + (-3 \times 9)/(4 \times 9)$$

$$28/36 + -27/36$$

Since the denominators are same we can add them directly

$$(28-27)/36 = 1/36$$

(vi) $5/26 + 11/-39$

Solution: Firstly convert the denominator to positive number

$$11/-39 = (11 \times -1)/(-39 \times -1) = -11/39$$

$$5/26 + -11/39$$

Now let us take the LCM for 26 and 39 which is 78

$$(5 \times 3)/(26 \times 3) + (-11 \times 2)/(39 \times 2)$$

$$15/78 + -22/78$$

Since the denominators are same we can add them directly

$$(15-22)/78 = -7/78$$

(vii) $-16/9 + -5/12$

Solution: let us take the LCM for 9 and 12 which is 36

$$(-16 \times 4)/(9 \times 4) + (-5 \times 3)/(12 \times 3)$$

$$-192/108 + -45/108$$

Since the denominators are same we can add them directly

$$(-192-45)/108 = -237/108$$

Further divide the fraction by 3 we get,

$$-237/108 = -79/36$$

(viii) $-13/8 + 5/36$

Solution: let us take the LCM for 8 and 36 which is 72

$$(-13 \times 9)/(8 \times 9) + (5 \times 2)/(36 \times 2)$$

$$-117/72 + 10/72$$

Since the denominators are same we can add them directly

$$(-117+10)/72 = -107/72$$

(ix) $0 + -3/5$

Solution: We know that anything added to 0 results in the same.

$$0 + -3/5 = -3/5$$

(x) $1 + -4/5$

Solution: let us take the LCM for 1 and 5 which is 5

$$(1 \times 5)/(1 \times 5) + (-4 \times 1)/(5 \times 1)$$

$$5/5 + -4/5$$

Since the denominators are same we can add them directly

$$(5-4)/5 = 1/5$$

4. Add and express the sum as a mixed fraction:

(i) $-12/5$ and $43/10$

Solution: let us add the given fraction

$$-12/5 + 43/10$$

let us take the LCM for 5 and 10 which is 10

$$(-12 \times 2)/(5 \times 2) + (43 \times 1)/(10 \times 1)$$

$$-24/10 + 43/10$$

Since the denominators are same we can add them directly

$$(-24+43)/10 = 19/10$$

19/10 can be written as $1 \frac{9}{10}$ in mixed fraction.

(ii) $24/7$ and $-11/4$

Solution: let us add the given fraction

$$24/7 + -11/4$$

let us take the LCM for 7 and 4 which is 28

$$(24 \times 4)/(7 \times 4) + (-11 \times 7)/(4 \times 7)$$

$$96/28 + -77/28$$

Since the denominators are same we can add them directly
 $(96-77)/28 = 19/28$

(iii) $-31/6$ and $-27/8$

Solution: let us add the given fraction

$$-31/6 + -27/8$$

let us take the LCM for 6 and 8 which is 24

$$(-31 \times 4)/(6 \times 4) + (-27 \times 3)/(8 \times 3)$$

$$-124/24 + -81/24$$

Since the denominators are same we can add them directly

$$(-124-81)/24 = -205/24$$

$-205/24$ can be written as $-8 \frac{13}{24}$ in mixed fraction.

(iv) $101/6$ and $7/8$

Solution: let us add the given fraction

$$101/6 + 7/8$$

let us take the LCM for 6 and 8 which is 24

$$(101 \times 4)/(6 \times 4) + (7 \times 3)/(8 \times 3)$$

$$404/24 + 21/24$$

Since the denominators are same we can add them directly

$$(404+21)/24 = 425/24$$

$425/24$ can be written as $17 \frac{17}{24}$ in mixed fraction.