

EXERCISE 5.2

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

(i)  $(3/8)$ ,  $(5/8)$

(ii)  $(-7/9)$ ,  $(4/9)$

(iii)  $(-2/11)$ ,  $(-9/11)$

(iv)  $(11/13)$ ,  $(-4/13)$

**Solution:**

(i) Given  $(3/8)$ ,  $(5/8)$

$$(5/8) - (3/8) = (5 - 3)/8$$

$$= (2/8)$$

$$= (1/4)$$

(ii) Given  $(-7/9)$ ,  $(4/9)$

$$(4/9) - (-7/9) = (4/9) + (7/9)$$

$$= (4 + 7)/9$$

$$= (11/9)$$

(iii) Given  $(-2/11)$ ,  $(-9/11)$

$$(-9/11) - (-2/11) = (-9/11) + (2/11)$$

$$= (-9 + 2)/11$$

$$= (-7/11)$$

(iv) Given  $(11/13)$ ,  $(-4/13)$

$$(-4/13) - (11/13) = (-4 - 11)/13$$

$$= (-15/13)$$

2. Evaluate each of the following:

(i)  $(2/3) - (3/5)$

(ii)  $(-4/7) - (2/-3)$

(iii)  $(4/7) - (-5/-7)$

(iv)  $-2 - (5/9)$

**Solution:**

(i) Given  $(2/3) - (3/5)$

The LCM of 3 and 5 is 15



Consider  $(2/3) = (2/3) \times (5/5) = (10/15)$   
Now again  $(3/5) = (3/5) \times (3/3) = (9/15)$   
 $(2/3) - (3/5) = (10/15) - (9/15)$   
 $= (1/15)$

(ii) Given  $(-4/7) - (2/-3)$   
The LCM of 7 and 3 is 21  
Consider  $(-4/7) = (-4/7) \times (3/3) = (-12/21)$   
Again  $(2/-3) = (-2/3) \times (7/7) = (-14/21)$   
 $(-4/7) - (2/-3) = (-12/21) - (-14/21)$   
 $= (-12 + 14)/21$   
 $= (2/21)$

(iii) Given  $(4/7) - (-5/-7)$   
 $(4/7) - (5/7) = (4 - 5)/7$   
 $= (-1/7)$

(iv) Given  $-2 - (5/9)$   
Consider  $(-2/1) = (-2/1) \times (9/9) = (-18/9)$   
 $-2 - (5/9) = (-18/9) - (5/9)$   
 $= (-18 - 5)/9$   
 $= (-23/9)$

**3. The sum of the two numbers is  $(5/9)$ . If one of the numbers is  $(1/3)$ , find the other.**

**Solution:**

Given sum of two numbers is  $(5/9)$

And one them is  $(1/3)$

Let the unknown number be x

$$x + (1/3) = (5/9)$$

$$x = (5/9) - (1/3)$$

LCM of 3 and 9 is 9

$$\text{Consider } (1/3) = (1/3) \times (3/3) = (3/9)$$

On substituting we get

$$x = (5/9) - (3/9)$$

$$x = (5 - 3)/9$$

$$x = (2/9)$$

**4. The sum of two numbers is  $(-1/3)$ . If one of the numbers is  $(-12/3)$ , find the other.**

**Solution:**

Given sum of two numbers =  $(-1/3)$

One of them is  $(-12/3)$

Let the required number be  $x$

$$x + (-12/3) = (-1/3)$$

$$x = (-1/3) - (-12/3)$$

$$x = (-1/3) + (12/3)$$

$$x = (-1 + 12)/3$$

$$x = (11/3)$$

**5. The sum of two numbers is  $(-4/3)$ . If one of the numbers is  $-5$ , find the other.**

**Solution:**

Given sum of two numbers =  $(-4/3)$

One of them is  $-5$

Let the required number be  $x$

$$x + (-5) = (-4/3)$$

LCM of 1 and 3 is 3

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

On substituting

$$x + (-15/3) = (-4/3)$$

$$x = (-4/3) - (-15/3)$$

$$x = (-4/3) + (15/3)$$

$$x = (-4 + 15)/3$$

$$x = (11/3)$$

**6. The sum of two rational numbers is  $-8$ . If one of the numbers is  $(-15/7)$ , find the other.**

**Solution:**

Given sum of two numbers is  $-8$

One of them is  $(-15/7)$

Let the required number be  $x$

$$x + (-15/7) = -8$$

The LCM of 7 and 1 is 7

$$\text{Consider } (-8/1) = (-8/1) \times (7/7) = (-56/7)$$

On substituting

$$x + (-15/7) = (-56/7)$$

$$x = (-56/7) - (-15/7)$$

$$x = (-56/7) + (15/7)$$

$$x = (-56 + 15)/7$$

$$x = (-41/7)$$

**7. What should be added to  $(-7/8)$  so as to get  $(5/9)$ ?**

**Solution:**

Given  $(-7/8)$

Let the required number be  $x$

$$x + (-7/8) = (5/9)$$

The LCM of 8 and 9 is 72

$$x = (5/9) - (-7/8)$$

$$x = (5/9) + (7/8)$$

$$\text{Consider } (5/9) = (5/9) \times (8/8) = (40/72)$$

$$\text{Again } (7/8) = (7/8) \times (9/8) = (63/72)$$

On substituting

$$x = (40/72) + (63/72)$$

$$x = (40 + 63)/72$$

$$x = (103/72)$$

**8. What number should be added to  $(-5/11)$  so as to get  $(26/33)$ ?**

**Solution:**

Given  $(-5/11)$

Let the required number be  $x$

$$x + (-5/11) = (26/33)$$

$$x = (26/33) - (-5/11)$$

$$x = (26/33) + (5/11)$$

$$\text{Consider } (5/11) = (5/11) \times (3/3) = (15/33)$$

On substituting

$$x = (26/33) + (15/33)$$

$$x = (41/33)$$

**9. What number should be added to  $(-5/7)$  to get  $(-2/3)$ ?**

**Solution:**

Given  $(-5/7)$

Let the required number be  $x$

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

$$x = (-2/3) - (-5/7)$$

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

LCM of 3 and 7 is 21

$$\text{Consider } (-2/3) = (-2/3) \times (7/7) = (-14/21)$$

$$\text{Again } (5/7) = (5/7) \times (3/3) = (15/21)$$

On substituting

$$x = (-14/21) + (15/21)$$

$$x = (-14 + 15)/21$$

$$x = (1/21)$$

**10. What number should be subtracted from  $(-5/3)$  to get  $(5/6)$ ?**

**Solution:**

Given  $(-5/3)$

Let the required number be  $x$

$$(-5/3) - x = (5/6)$$

$$-x = (5/6) - (-5/3)$$

$$-x = (5/6) + (5/3)$$

$$\text{Consider } (5/3) = (5/3) \times (2/2) = (10/6)$$

On substituting

$$-x = (5/6) + (10/6)$$

$$-x = (15/6)$$

$$x = (-15/6)$$

**11. What number should be subtracted from  $(3/7)$  to get  $(5/4)$ ?**

**Solution:**

Given  $(3/7)$

Let the required number be  $x$

$$(3/7) - x = (5/4)$$

$$-x = (5/4) - (3/7)$$

The LCM of 4 and 7 is 28

$$\text{Consider } (5/4) = (5/4) \times (7/7) = (35/28)$$

$$\text{Again } (3/7) = (3/7) \times (4/4) = (12/28)$$

On substituting

$$-x = (35/28) - (12/28)$$

$$-x = (35 - 12)/28$$

$$-x = (23/28)$$

$$x = (-23/28)$$

**12. What should be added to  $((2/3) + (3/5))$  to get  $(-2/15)$ ?**

**Solution:**

$$\text{Given } ((2/3) + (3/5))$$

Let the required number be x

$$((2/3) + (3/5)) + x = (-2/15)$$

$$\text{Consider } (2/3) = (2/3) \times (5/5) = (10/15)$$

$$\text{Again } (3/5) = (3/5) \times (3/3) = (9/15)$$

On substituting

$$((10/15) + (9/15)) + x = (-2/15)$$

$$x = (-2/15) - ((10/15) + (9/15))$$

$$x = (-2/15) - (19/15)$$

$$x = (-2 - 19)/15$$

$$x = (-21/15)$$

$$x = (-7/5)$$

**13. What should be added to  $((1/2) + (1/3) + (1/5))$  to get 3?**

**Solution:**

$$\text{Given } ((1/2) + (1/3) + (1/5))$$

Let the required number be x

$$((1/2) + (1/3) + (1/5)) + x = 3$$

$$x = 3 - ((1/2) + (1/3) + (1/5))$$

LCM of 2, 3 and 5 is 30

$$\text{Consider } (1/2) = (1/2) \times (15/15) = (15/30)$$

$$(1/3) = (1/3) \times (10/10) = (10/30)$$

$$(1/5) = (1/5) \times (6/6) = (6/30)$$

On substituting

$$x = 3 - ((15/30) + (10/30) + (6/30))$$

$$x = 3 - (31/30)$$

$$(3/1) = (3/1) \times (30/30) = (90/30)$$

$$x = (90/30) - (31/30)$$

$$x = (90 - 31)/30$$

$$x = (59/30)$$

**14. What should be subtracted from  $((3/4) - (2/3))$  to get  $(-1/6)$ ?**

**Solution:**

$$\text{Given } ((3/4) - (2/3))$$

Let the required number be  $x$

$$((3/4) - (2/3)) - x = (-1/6)$$

$$-x = (-1/6) - ((3/4) - (2/3))$$

$$\text{Consider } (3/4) = (3/4) \times (3/3) = (9/12)$$

$$(2/3) = (2/3) \times (4/4) = (8/12)$$

On substituting

$$-x = (-1/6) - ((9/12) - ((8/12)))$$

$$-x = (-1/6) - (1/12)$$

$$(1/6) = (1/6) \times (2/2) = (2/12)$$

$$-x = (-2/12) - (1/12)$$

$$-x = (-2 - 1)/12$$

$$-x = (-3/12)$$

$$x = (3/12)$$

$$x = (1/4)$$

**15. Simplify:**

(i)  $(-3/2) + (5/4) - (7/4)$

(ii)  $(5/3) - (7/6) + (-2/3)$

(iii)  $(5/4) - (7/6) - (-2/3)$

(iv)  $(-2/5) - (-3/10) - (-4/7)$

**Solution:**

(i) Given  $(-3/2) + (5/4) - (7/4)$

Consider  $(-3/2) = (-3/2) \times (2/2) = (-6/4)$

On substituting

$$(-3/2) + (5/4) - (7/4) = (-6/4) + (5/4) - (7/4)$$

$$\begin{aligned} &= (-6 + 5 - 7)/4 \\ &= (-13 + 5)/4 \\ &= (-8/4) \\ &= -2 \end{aligned}$$

(ii) Given  $(5/3) - (7/6) + (-2/3)$   
Consider  $(5/3) = (5/3) \times (2/2) = (10/6)$   
 $(-2/3) = (-2/3) \times (2/2) = (-4/6)$   
 $(5/3) - (7/6) + (-2/3) = (10/6) - (7/6) - (4/6)$   
 $= (10 - 7 - 4)/6$   
 $= (10 - 11)/6$   
 $= (-1/6)$

(iii) Given  $(5/4) - (7/6) - (-2/3)$   
The LCM of 4, 6 and 3 is 12  
Consider  $(5/4) = (5/4) \times (3/3) = (15/12)$   
 $(7/6) = (7/6) \times (2/2) = (14/12)$   
 $(-2/3) = (-2/3) \times (4/4) = (-8/12)$   
 $(5/4) - (7/6) - (-2/3) = (15/12) - (14/12) + (8/12)$   
 $= (15 - 14 + 8)/12$   
 $= (9/12)$   
 $= (3/4)$

(iv) Given  $(-2/5) - (-3/10) - (-4/7)$   
The LCM of 5, 10 and 7 is 70  
Consider  $(-2/5) = (-2/5) \times (14/14) = (-28/70)$   
 $(-3/10) = (-3/10) \times (7/7) = (-21/70)$   
 $(-4/7) = (-4/7) \times (10/10) = (-40/70)$   
On substituting  
 $(-2/5) - (-3/10) - (-4/7) = (-28/70) + (21/70) + (40/70)$   
 $= (-28 + 21 + 40)/70$   
 $= (33/70)$

**16. Fill in the blanks:**

(i)  $(-4/13) - (-3/26) = \dots$

(ii)  $(-9/14) + \dots = -1$

(iii)  $(-7/9) + \dots = 3$

(iv) ..... + (15/23) = 4

**Solution:**

(i) (-5/26)

**Explanation:**

Consider  $(-4/13) - (-3/26)$

$$(-4/13) = (-4/13) \times (2/2) = (-8/26)$$

$$\begin{aligned} (-4/13) - (-3/26) &= (-8/26) - (-3/26) \\ &= (-5/26) \end{aligned}$$

(ii) (-5/14)

**Explanation:**

Given  $(-9/14) + \dots = -1$

$$(-9/14) + 1 = \dots$$

$$(-9/14) + (14/14) = (5/14)$$

$$(-9/14) + (-5/14) = -1$$

(iii) (34/9)

**Explanation:**

Given  $(-7/9) + \dots = 3$

$$(-7/9) + x = 3$$

$$x = 3 + (7/9)$$

$$(3/1) = (3/1) \times (9/9) = (27/9)$$

$$x = (27/9) + (7/9) = (34/9)$$

(iv) (77/23)

**Explanation:**

Given ..... + (15/23) = 4

$$x + (15/23) = 4$$

$$x = 4 - (15/23)$$

$$(4/1) = (4/1) \times (23/23) = (92/23)$$

$$x = (92/23) - (15/23)$$

$$= (77/23)$$

