EXERCISE 5.1

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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:
(i) Given (-5/7) and (3/7)
= (-5/7) + (3/7)
Here denominators are same so add the numerator
= ((-5+3)/7)
= (-2/7)

(ii) Given (-15/4) and (7/4)
= (-15/4) + (7/4)
Here denominators are same so add the numerator
= ((-15 + 7)/4)
= (-8/4)
On simplifying
= -2

(iii) Given (-8/11) and (-4/11)
= (-8/11) + (-4/11)
Here denominators are same so add the numerator
= (-8 + (-4))/11
= (-12/11)

(iv) Given (6/13) and (-9/13)
= (6/13) + (-9/13)
Here denominators are same so add the numerator
= (6 + (-9))/13
= (-3/13)

2. Add the following rational numbers:
(i) (3/4) and (-3/5)

(ii) -3 and (3/5)
(iii) (-7/27) and (11/18)
(iv) (31/-4) and (-5/8)

Solution:
(i) Given (3/4) and (-3/5)
If p/q and r/s are two rational numbers such that q and s do not have a common factor other than one, then
(p/q) + (r/s) = (p × s + r × q)/ (q × s)
(3/4) + (-3/5) = (3 × 5 + (-3) × 4)/ (4 × 5)
= (15 – 12)/ 20
= (3/20)

(ii) Given -3 and (3/5)
If p/q and r/s are two rational numbers such that q and s do not have a common factor other than one, then
(p/q) + (r/s) = (p × s + r × q)/ (q × s)
(-3/1) + (3/5) = (-3 × 5 + 3 × 1)/ (1 × 5)
= (-15 + 3)/ 5
= (-12/5)

(iii) Given (-7/27) and (11/18)
LCM of 27 and 18 is 54
(-7/27) = (-7/27) × (2/2) = (-14/54)
(11/18) = (11/18) × (3/3) = (33/54)
(-7/27) + (11/18) = (-14 + 33)/54
= (19/54)

(iv) Given (31/-4) and (-5/8)
LCM of -4 and 8 is 8
(31/-4) = (31/-4) × (2/2) = (62/-8)
(31/-4) + (-5/8) = (-62 - 5)/8
= (-67/8)

3. Simplify:
(i) (8/9) + (-11/6)
(ii) (-5/16) + (7/24)

(iii) (1/-12) + (2/-15)
(iv) (-8/19) + (-4/57)

Solution:
(i) Given (8/9) + (-11/6)
The LCM of 9 and 6 is 18
(8/9) = (8/9) × (2/2) = (16/18)
(-11/6) = (-11/6) × (3/3) = (-33/18)
= (16 – 33)/18
= (-17/18)

(ii) Given (-5/16) + (7/24)
The LCM of 16 and 24 is 48
Now (-5/16) = (-5/16) × (3/3) = (-15/48)
Consider (7/24) = (7/24) × (2/2) = (14/48)
(-5/16) + (7/24) = (-15/48) + (14/48)
= (14 – 15) /48
= (-1/48)

(iii) Given (1/-12) + (2/-15)
The LCM of 12 and 15 is 60
Consider (-1/12) = (-1/12) × (5/5) = (-5/60)
Now (2/-15) = (-2/15) × (4/4) = (-8/60)
(1/-12) + (2/-15) = (-5/60) + (-8/60)
= (-5 – 8)/60
= (-13/60)

(iv) Given (-8/19) + (-4/57)
The LCM of 19 and 57 is 57
Consider (-8/57) = (-8/57) × (3/3) = (-24/57)
(-8/19) + (-4/57) = (-24/57) + (-4/57)
= (-24 – 4)/57
= (-28/57)

4. Add and express the sum as mixed fraction:
(i) (-12/5) + (43/10)
(ii) (24/7) + (-11/4)

(iii) (-31/6) + (-27/8)

Solution:

(i) Given (-12/5) + (43/10)
The LCM of 5 and 10 is 10
Consider (-12/5) = (-12/5) × (2/2) = (-24/10)
(-12/5) + (43/10) = (-24/10) + (43/10)
= (-24 + 43)/10
= (19/10)
Now converting it into mixed fraction
= 1 9/10

(ii) Given (24/7) + (-11/4)
The LCM of 7 and 4 is 28
Consider (24/7) = (24/7) × (4/4) = (96/28)
Again (-11/4) = (-11/4) × (7/7) = (-77/28)
(24/7) + (-11/4) = (96/28) + (-77/28)
= (96 – 77)/28
= (19/28)

(iii) Given (-31/6) + (-27/8)
The LCM of 6 and 8 is 24
Consider (-31/6) = (-31/6) × (4/4) = (-124/24)
Again (-27/8) = (-27/8) × (3/3) = (-81/24)
(-31/6) + (-27/8) = (-124/24) + (-81/24)
= (-124 – 81)/24
= (-205/24)
Now converting it into mixed fraction
= -8 13/24