EXERCISE 3B

1. For each pair, given below, state whether it forms like fractions or unlike fractions:
(i) 5/8 and 7/8
(ii) 8/15 and 8/21
(iii) 4/9 and 9/4
Solution:

(i) 5/8 and 7/8 are like fractions.

(ii) 8/15 and 8/21 are unlike fractions.

(iii) 4/9 and 9/4 are unlike fractions.

2. Convert given fractions into fractions with equal denominators:
(i) 5/6 and 7/9
(ii) 2/3, 5/6 and 7/12
(iii) 4/5, 17/20, 23/20 and 11/16
Solution:

(i) 5/6 and 7/9
Here the LCM of 6 and 9 is 18
5/6 = (5 × 3)/ (6 × 3) = 15/18
7/9 = (7 × 2)/ (9 × 2) = 14/18
Therefore, 15/18 and 14/18 are the required fractions.

(ii) 2/3, 5/6 and 7/12
Here the LCM of 3, 6 and 12 is 12
2/3 = (2 × 4)/ (3 × 4) = 8/12
5/6 = (5 × 2)/ (6 × 2) = 10/12
7/12 = 7/12
Therefore, 8/12, 10/12 and 7/12 are the required fractions.

(iii) 4/5, 17/20, 23/40 and 11/16
Here the LCM of 5, 20, 40 and 16 is 80
4/5 = (4 × 16)/ (5 × 16) = 64/80
17/20 = (17 × 4)/ (20 × 4) = 68/80
23/40 = (23 × 2)/ (40 × 2) = 46/80
11/16 = (11 × 5)/ (16 × 5) = 55/80
Therefore, 64/80, 68/80, 46/80 and 55/80 are the required fractions.

3. Convert given fractions into fractions with equal numerators:
(i) 8/9 and 12/17
(ii) 6/13, 15/23 and 12/17
(iii) 15/19, 25/28, 9/11 and 45/47
Solution:

(i) 8/9 and 12/17
Here the LCM of 8 and 12 is 24
8/9 = (8 × 3)/ (9 × 3) = 24/27

12/17 = (12 × 2)/ (17 × 2) = 24/34
Therfore, 24/27 and 24/34 are the required fractions.

(ii) 6/13, 15/23 and 12/17
Here the LCM of 6, 15 and 12 is 60
6/13 = (6 × 10)/ (13 × 10) = 60/130
15/23 = (15 × 4)/ (23 × 4) = 60/92
12/17 = (12 × 5)/ (17 × 5) = 60/85
Therefore, 60/130, 60/92 and 60/85 are the required fractions.

(iii) 15/19, 25/28, 9/11 and 45/47
Here the LCM of 15, 25, 9 and 45 is 225
15/19 = (15 × 15)/ (19 × 15) = 225/285
25/28 = (25 × 9)/ (28 × 9) = 225/252
9/11 = (9 × 25)/ (11 × 25) = 225/275
45/47 = (45 × 5)/ (47 × 5) = 225/ 235
Therefore, 225/285, 225/252, 225/275 and 225/235 are the required fractions.

4. Put the given fractions in ascending order by making denominators equal:
(i) 1/3, 2/5, 3/4 and 1/6
(ii) 5/6, 7/8, 11/12 and 3/10
(iii) 5/7, 3/8, 9/14 and 20/21
Solution:

(i) 1/3, 2/5, 3/4 and 1/6
Here the LCM of 3, 5, 4 and 6 is 60
1/3 = (1 × 20)/ (3 × 20) = 20/60
2/5 = (2 × 12)/ (5 × 12) = 24/60
3/4 = (3 × 15)/ (4 × 15) = 45/60
1/6 = (1 × 10)/ (6 × 10) = 10/60
So we get
10/60 < 20/60 < 24/60 < 45/60
It can be written as
1/6 < 1/3 < 2/5 < 3/4
Therefore, 1/6, 1/3, 2/5 and 3/4 are in ascending order.

(ii) 5/6, 7/8, 11/12 and 3/10
Here the LCM of 6, 8, 12 and 10 is 240
5/6 = (5 × 40)/ (6 × 40) = 200/240
7/8 = (7 × 30)/ (8 × 30) = 210/240
11/12 = (11 × 20)/ (12 × 20) = 220/240
3/10 = (3 × 24)/ (10 × 24) = 72/240
So we get
72/240 < 200/240 < 210/240 < 220/240
It can be written as
3/10 < 5/6 < 7/8 < 11/12
Therefore, 3/10, 5/6, 7/8 and 11/12 are in ascending order.

(iii) 5/7, 3/8, 9/14 and 20/21
Here the LCM of 7, 8, 14 and 21 is 168

5/7 = (5 × 24)/ (7 × 24) = 120/168
3/8 = (3 × 21)/ (8 × 21) = 63/168
9/14 = (9 × 12)/ (14 × 12) = 108/168
20/21 = (20 × 8)/ (21 × 8) = 160/168
So we get
63/168 < 108/ 168 < 120/168 < 160/168
It can be written as
3/8 < 9/14 < 5/7 < 20/21
Therefore, 3/8, 9/14, 5/7 and 20/21 are in ascending order.

5. Arrange the given fractions in descending order by making numerators equal:
(i) 5/6, 4/15, 8/9 and 1/3
(ii) 3/7, 4/9, 5/7 and 8/11
(iii) 1/10, 6/11, 8/11 and 3/5
Solution:

(i) 5/6, 4/15, 8/9 and 1/3
Here the LCM of 5, 4, 8 and 1 is 40
5/6 = (5 × 8)/ (6 × 8) = 40/48
4/15 = (4 × 10)/ (15 × 10) = 40/150
8/9 = (8 × 5)/ (9 × 5) = 40/45
1/3 = (1 × 40)/ (3 × 40) = 40/120
So we get
40/45 > 40/48 > 40/120 > 40/150
It can be written as
8/9 > 5/6 > 1/3 > 4/15
Therefore, 8/9, 5/6, 1/3 and 4/15 are in descending order.

(ii) 3/7, 4/9, 5/7 and 8/11
Here the LCM of 3, 4, 5 and 8 is 120
3/7 = (3 × 40)/ (7 × 40) = 120/280
4/9 = (4 × 30)/ (9 × 30) = 120/270
5/7 = (5 × 24)/ (7 × 24) = 120/168
8/11 = (8 × 15)/ (11 × 15) = 120/165
So we get
120/165 > 120/168 > 120/270 > 120/280
It can be written as
8/11 > 5/7 > 4/9 > 3/7
Therefore, 8/11, 5/7, 4/9 and 3/7 are in descending order.

(iii) 1/10, 6/11, 8/11 and 3/5
Here the LCM of 1, 6, 8 and 3 is 24
1/10 = (1 × 24)/ (10 × 24) = 24/240
6/11 = (6 × 4)/ (11 × 4) = 24/44
8/11 = (8 × 3)/ (11 × 3) = 24/33
3/5 = (3 × 8)/ (5 × 8) = 24/40
So we get
24/33 > 24/40 > 24/44 > 24/240
It can be written as
8/11 > 3/5 > 6/11 > 1/10

Therefore, 8/11, 3/5, 6/11 and 1/10 are in descending order.

6. Find the greater fraction:
(i) 3/5 and 11/15
(ii) 4/5 and 3/10
(iii) 6/7 and 5/9
Solution:

(i) 3/5 and 11/15
Here the LCM of 5 and 15 is 15
3/5 = (3 × 3)/ (5 × 3) = 9/ 15
11/15 = 11/15
So we get, 11/15 > 9/15
Therefore, 11/15 is greater.

(ii) 4/5 and 3/10
Here the LCM of 5 and 10 is 10
4/5 = (4 × 2)/ (5 × 2) = 8/10
3/10 = 3/10
So we get, 8/10 > 3/10
4/5 > 3/10
Therefore, 4/5 is greater.

(iii) 6/7 and 5/9
Here LCM of 7 and 9 is 63
6/7 = (6 × 9)/ (7 × 9) = 54/63
5/9 = (5 × 7)/ (9 × 7) = 35/63
So we get, 54/63 > 35/63
6/7 > 35/63
Therefore, 6/7 is greater.

7. Insert one fraction between:
(i) 3/7 and 4/9
(ii) 2 and 8/3
(iii) 9/17 and 6/13
Solution:

(i) 3/7 and 4/9
So the fraction between 3/7 and 4/9
= (3 + 4)/ (7 + 9)
= 7/16

(ii) 2 and 8/3
So the fraction between 2 and 8/3
= (2 + 8)/ (1 + 3)
= 10/4
Dividing by 2
= 5/2
= 2 ½

(iii) 9/17 and 6/13
So the fraction between 9/17 and 6/13
= (9 + 6)/ (17 + 13)
= 15/30
By division
= 1/2

8. Insert three fractions between:
(i) 2/5 and 4/9
(ii) 1/2 and 5/7
(iii) 3/8 and 6/11
Solution:

(i) 2/5 and 4/9
So the fraction between 2/5 and 4/9
= (2 + 4)/ (5 + 9)
By addition
= 6/14
Dividing by 2
= 3/7

Fraction between 2/5 and 3/7
= (2 + 3)/ (5 + 7)
= 5/12

Fraction between 3/7 and 4/9
= (3 + 4)/ (7 + 9)
= 7/16

Therefore, three fractions between 2/5 and 4/9 will be 5/12, 3/7 and 7/16.

(ii) 1/2 and 5/7
So the fraction between 1/2 and 5/7
= (1 + 5)/ (2 + 7)
By addition
= 6/ 9
Dividing by 3
= 2/ 3

Fraction between 1/2 and 2/3
= (1 + 2)/ (2 + 3)
= 3/ 5

Fraction between 2/3 and 5/7
= (2 + 5)/ (3 + 7)
= 7/ 10

Therefore, three fractions between 1/2 and 5/7 will be 3/5, 2/3 and 7/10.

(iii) 3/8 and 6/11

So the fraction between 3/8 and 6/11
= (3 + 6)/ (8 + 11)
= 9/ 19

Fraction between 3/8 and 9/19
= (3 + 9)/ (8 + 19)
= 12/27
= 4/9

Fraction between 9/19 and 6/11
= (9 + 6)/ (19 + 11)
= 15/30
= 1/2

Therefore, three fractions between 3/8 and 6/11 will be 4/9, 9/19 and 1/2.

9. Insert two fractions between:
(i) 1 and 3/11
(ii) 5/9 and 1/4
(iii) 5/6 and 1 1/5
Solution:

(i) 1 and 3/11
Fraction between 1 and 3/11
= (1 + 3)/ (1 + 11)
By addition
= 4/12
= 1/3
Fraction between 1/3 and 3/11
= (1 + 3)/ (3 + 11)
By addition
= 4/14
Dividing by 2
= 2/7

Therefore, two fractions between 1 and 3/11 will be 1/3 and 2/7.

(ii) 5/9 and 1/4
Fraction between 5/9 and 1/4
= (5 + 1)/ (9 + 4)
By addition
= 6/13
Fraction between 6/13 and 1/4
= (6 + 1)/ (13 + 4)
By addition
= 7/17

Therefore, two fractions between 5/9 and 1/4 will be 6/13 and 7/17.

(iii) 5/6 and 1 1/5

It can be written as
= 5/6 + 6/5
Fraction between 5/6 and 6/5
= (5 + 6)/ (6 + 5)
By addition
= 11/11
= 1
Fraction between 1 and 6/5
= (1 + 6)/ (1 + 5)
By addition
= 7/6
= 1 1/6

Therefore, two fractions between 5/6 and 1 1/5 will be 1 and 1 1/6.