

EXERCISE 3B

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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) $4/5$, $17/20$, $23/40$ and $11/16$

Solution:

(i) $5/6$ and $7/9$
Here the LCM of 6 and 9 is 18
 $5/6 = (5 \times 3) / (6 \times 3) = 15/18$
 $7/9 = (7 \times 2) / (9 \times 2) = 14/18$
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
 $2/3 = (2 \times 4) / (3 \times 4) = 8/12$
 $5/6 = (5 \times 2) / (6 \times 2) = 10/12$
 $7/12 = 7/12$
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
 $4/5 = (4 \times 16) / (5 \times 16) = 64/80$
 $17/20 = (17 \times 4) / (20 \times 4) = 68/80$
 $23/40 = (23 \times 2) / (40 \times 2) = 46/80$
 $11/16 = (11 \times 5) / (16 \times 5) = 55/80$
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
 $8/9 = (8 \times 3) / (9 \times 3) = 24/27$

$$12/17 = (12 \times 2) / (17 \times 2) = 24/34$$

Therefore, 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

$$6/13 = (6 \times 10) / (13 \times 10) = 60/130$$

$$15/23 = (15 \times 4) / (23 \times 4) = 60/92$$

$$12/17 = (12 \times 5) / (17 \times 5) = 60/85$$

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

$$15/19 = (15 \times 15) / (19 \times 15) = 225/285$$

$$25/28 = (25 \times 9) / (28 \times 9) = 225/252$$

$$9/11 = (9 \times 25) / (11 \times 25) = 225/275$$

$$45/47 = (45 \times 5) / (47 \times 5) = 225/235$$

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

$$1/3 = (1 \times 20) / (3 \times 20) = 20/60$$

$$2/5 = (2 \times 12) / (5 \times 12) = 24/60$$

$$3/4 = (3 \times 15) / (4 \times 15) = 45/60$$

$$1/6 = (1 \times 10) / (6 \times 10) = 10/60$$

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

$$5/6 = (5 \times 40) / (6 \times 40) = 200/240$$

$$7/8 = (7 \times 30) / (8 \times 30) = 210/240$$

$$11/12 = (11 \times 20) / (12 \times 20) = 220/240$$

$$3/10 = (3 \times 24) / (10 \times 24) = 72/240$$

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

$$5/7 = (5 \times 24) / (7 \times 24) = 120/168$$

$$3/8 = (3 \times 21) / (8 \times 21) = 63/168$$

$$9/14 = (9 \times 12) / (14 \times 12) = 108/168$$

$$20/21 = (20 \times 8) / (21 \times 8) = 160/168$$

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

$$5/6 = (5 \times 8) / (6 \times 8) = 40/48$$

$$4/15 = (4 \times 10) / (15 \times 10) = 40/150$$

$$8/9 = (8 \times 5) / (9 \times 5) = 40/45$$

$$1/3 = (1 \times 40) / (3 \times 40) = 40/120$$

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

$$3/7 = (3 \times 40) / (7 \times 40) = 120/280$$

$$4/9 = (4 \times 30) / (9 \times 30) = 120/270$$

$$5/7 = (5 \times 24) / (7 \times 24) = 120/168$$

$$8/11 = (8 \times 15) / (11 \times 15) = 120/165$$

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

$$1/10 = (1 \times 24) / (10 \times 24) = 24/240$$

$$6/11 = (6 \times 4) / (11 \times 4) = 24/44$$

$$8/11 = (8 \times 3) / (11 \times 3) = 24/33$$

$$3/5 = (3 \times 8) / (5 \times 8) = 24/40$$

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, $\frac{8}{11}$, $\frac{3}{5}$, $\frac{6}{11}$ and $\frac{1}{10}$ are in descending order.

6. Find the greater fraction:

(i) $\frac{3}{5}$ and $\frac{11}{15}$

(ii) $\frac{4}{5}$ and $\frac{3}{10}$

(iii) $\frac{6}{7}$ and $\frac{5}{9}$

Solution:

(i) $\frac{3}{5}$ and $\frac{11}{15}$

Here the LCM of 5 and 15 is 15

$$\frac{3}{5} = \frac{(3 \times 3)}{(5 \times 3)} = \frac{9}{15}$$

$$\frac{11}{15} = \frac{11}{15}$$

So we get, $\frac{11}{15} > \frac{9}{15}$

Therefore, $\frac{11}{15}$ is greater.

(ii) $\frac{4}{5}$ and $\frac{3}{10}$

Here the LCM of 5 and 10 is 10

$$\frac{4}{5} = \frac{(4 \times 2)}{(5 \times 2)} = \frac{8}{10}$$

$$\frac{3}{10} = \frac{3}{10}$$

So we get, $\frac{8}{10} > \frac{3}{10}$

$$\frac{4}{5} > \frac{3}{10}$$

Therefore, $\frac{4}{5}$ is greater.

(iii) $\frac{6}{7}$ and $\frac{5}{9}$

Here LCM of 7 and 9 is 63

$$\frac{6}{7} = \frac{(6 \times 9)}{(7 \times 9)} = \frac{54}{63}$$

$$\frac{5}{9} = \frac{(5 \times 7)}{(9 \times 7)} = \frac{35}{63}$$

So we get, $\frac{54}{63} > \frac{35}{63}$

$$\frac{6}{7} > \frac{35}{63}$$

Therefore, $\frac{6}{7}$ is greater.

7. Insert one fraction between:

(i) $\frac{3}{7}$ and $\frac{4}{9}$

(ii) 2 and $\frac{8}{3}$

(iii) $\frac{9}{17}$ and $\frac{6}{13}$

Solution:

(i) $\frac{3}{7}$ and $\frac{4}{9}$

So the fraction between $\frac{3}{7}$ and $\frac{4}{9}$

$$= \frac{(3 + 4)}{(7 + 9)}$$

$$= \frac{7}{16}$$

(ii) 2 and $\frac{8}{3}$

So the fraction between 2 and $\frac{8}{3}$

$$= \frac{(2 + 8)}{(1 + 3)}$$

$$= \frac{10}{4}$$

Dividing by 2

$$= \frac{5}{2}$$

$$= 2 \frac{1}{2}$$

(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

$$= \frac{5}{6} + \frac{6}{5}$$

Fraction between $\frac{5}{6}$ and $\frac{6}{5}$

$$= \frac{(5 + 6)}{(6 + 5)}$$

By addition

$$= \frac{11}{11}$$

$$= 1$$

Fraction between 1 and $\frac{6}{5}$

$$= \frac{(1 + 6)}{(1 + 5)}$$

By addition

$$= \frac{7}{6}$$

$$= 1 \frac{1}{6}$$

Therefore, two fractions between $\frac{5}{6}$ and $1 \frac{1}{5}$ will be 1 and $1 \frac{1}{6}$.

