EXERCISE 8A PAGE: 124

1. Express each of the following ratios in simplest form:

i. 24 : 40

Solution:-

HCF of 24 and 40 is 8

$\therefore 24:40 = 24/40$

= (24 ÷ 8) / (40 ÷ 4)

= 3/5

= 3:5

Hence the simplest form of 24:40 is 3:5

ii. 13.5 : 15

Solution:-

The given ratio can be written as (13.5/15) = (135/150)

HCF of 135 and 150 is 15

$\therefore 135:150 = 135/150$

$= (135 \div 15)/ (150 \div 15)$

= 9/10

= 9:10

Hence the simplest form of 135:150 is 9:10

iii. [6(2/3)] : [7(1/2)]

Solution:-

First convert the given mixed fraction into improper fraction.

[6(2/3)]: [7(1/2)] = (20/3): (15/2)

By cross multiplication, we get,

= 40:45

HCF of 40 and 45 is 5

= (40 ÷ 5) / (45 ÷ 5)

= (8/9)

= 8:9

Hence the simplest form of 40:45 is 8:9

iv. (1/6) : (1/9)

Solution:-

By cross multiplication, we get,

= 9:6

HCF of 9 and 6 is 3

= (9 ÷ 3) / (6 ÷ 3)

= 3/2

= 3:2

Hence the simplest form of 9:6 is 3:2

v. **4 : 5 : (9/2)**

Solution:-

By cross multiplication above question can be written as,

= 4: 5: (9/2) = 8: 10: 9

HCF of 8, 10 and 9 is 1

∴ the simplest form of 8, 10 and 9 is 8:10:9

vi. **2.5 : 6.5 : 8**

Solution:-

The given ratio can be written as 2.5: 6.5: 8 = 25: 65: 80

HCF of 25, 65 and 80 is 5

= (25 ÷ 5)/ (65 ÷ 5) / (80 ÷ 5)

= 5/13/16

= 5:13:16

Hence the simplest form of 25:65:80 is 5:13:16

2. Express each of the following ratios in simplest form:

i. **75 paise : 3 rupees**

Solution:-

Converting both the given quantities in the same units, we have:

We know that,

= 1 rupee = 100paise

∴ 3 rupees = 300 paise

Then,

= 75:300

HCF of 75 and 300 is 75

= (75 ÷ 75) / (300 ÷ 75)

= 1/4

= 1paise: 4paise

ii. **1m 5cm : 63cm**

Solution:-

Converting both the given quantities in the same units, we have:

We know that,

= 1m = 100cm

Then,

= (1 × 100) cm + 5cm: 63cm

= 105cm: 63cm

HCF of 105 and 63 is 21

= (105 ÷ 21) / (63 ÷ 21)

= 5/3

= 5cm: 3cm

iii. 1 hour 5 minutes : 45 minutes

Solution:-

Converting both the given quantities in the same units, we have:

We know that,

= 1 hour = 60 minutes

Then,

= (1 × 60) minutes + 5 minutes: 45 minutes

= 65 minutes: 45 minutes

HCF of 65 and 45 is 5

= (65 ÷ 5) / (45 ÷ 5)

= 13/9

= 13minutes: 9minutes

iv. 8months : 1year

Solution:-

Converting both the given quantities in the same units, we have:

We know that,

= 1 year = 12 months

Then,

= 8 months: (1 × 12) months

= 8: 12

HCF of 8 and 12 is 4

= (8 ÷ 4) / (12 ÷ 4)

= 2/3

= 2months: 3months

v. (2kg 250g) : (3kg)

Solution:-

Converting both the given quantities in the same units, we have:

We know that,

= 1 kg = 1000g

Then,

= (2 × 1000) g + 250g: (3 × 1000) g

= 2250g: 3000g

HCF of 2250 and 3000 is 750

= (2250 ÷ 750) / (3000 ÷ 750)

= (3/4)

= 3 g: 4g

vi. 1km : 750m

Solution:-

Converting both the given quantities in the same units, we have:

We know that,
= 1 km = 1000m
Then,
= (1 × 1000) m: 750m
= 1000m: 750m
HCF of 1000 and 750 is 250
= (1000 ÷ 250) / (750 ÷ 250)
= (4/3)
= 4m: 3m

3. **If A: B = 7: 5 and B: C = 9: 14, find A: C.**
Solution:-
A: B = 7: 5 and B: C = 9: 14
= (A/B) = (7/5) and (B/C) = (9/14)
= (A/B) × (B/C) = (7/5) × (9/14)
= (A/C) = (9/10)
Hence, A: C = 9:10

4. **If A: B = 5: 8 and B: C = 16: 25, find A: C.**
Solution:-
A: B = 5: 8 and B: C = 16: 25
= (A/B) = (5/8) and (B/C) = (16/25)
= (A/B) × (B/C) = (5/8) × (16/25)
= (A/C) = (2/5)
Hence, A: C = 2:5

5. **If A: B =3: 5 and B: C = 10: 13, find A: B: C.**
Solution:-
A: B = 3: 5 and B: C = 10: 13
HCF of 3 and 5 is 1
= (3/5)
Then,
B: C= (10 ÷ 2)/ (13 ÷ 2)
B: C = 5: (13/2)
∴ A: B: C = 3: 5: (13/2)
A: B: C = 6: 10: 13

6. **If A: B =5: 6 and B: C = 4: 7, find A: B: C.**
Solution:-
A: B = 5: 6 and B: C = 4: 7
HCF of 5 and 6 is 1
= (5/6)
Then,

B: C= (4 × (6/4))/ (7 × (6/4))
B: C = (6 / (21/2))
B: C = 6: (21/2)
∴ A: B: C = 5: 6: (21/2)
A: B: C = 10: 12: 21

7. **Divide ₹360 between kunal and Mohit in the ratio 7: 8.**
Solution:-
From the question,
Sum of the ratios 7: 8 = 7 + 8 = 15
Total share kunal has = ₹ 360 × (7/15) = ₹168
Total share Mohit has = ₹ 360 × (8/15) = ₹192

8. **Divide ₹880 between Rajan and kamal in the ratio (1/5): (1/6)**
Solution:-
From the question,
Sum of the ratios (1/5): (1/6)
= (1/5) + (1/6)
= (6 + 5)/30
= 11/30
Total share Rajan has = ₹880 × [(1/5) / (11/30)]
= 880 × [(1/5) × (30/11)]
= 880 × (6/11)
= ₹480
Total share kamal has = ₹880 × [(1/6) / (11/30)]
= 880 × [(1/6) × (30/11)]
= 880 × (5/11)
= ₹400

9. **Divide ₹5600 between A, B and C in the ratio 1: 3: 4**
Solution:-
From the question,
Sum of the ratios 1: 3: 4 = 1 + 3 + 4 = 8
Total share A has = ₹ 5600 × (1/8) = ₹700
Total share B has = ₹ 5600 × (3/8) = ₹2100
Total share c has = ₹ 5600 × (4/8) = ₹2800

10. **What number must be added to each term of the ratio 9: 16 to make the ratio 2: 3?**
Solution:-
Let the number be x,
Then the two term becomes,
= (9 + x): (16 + x) = 2: 3
= (9 + x) / (16 + x) = (2/3)

By cross multiplication,

$= 3 \times (9 + x) = 2 \times (16 + x)$

$= 27 + 3x = 32 + 2x$

Transposing 27 to RHS and 2x to LHS

$= 3x - 2x = 32 - 27$

$= x = 5$

Hence, the number be added to each of the ratio 9:16 to make the ratio 2: 3 is 5

11. What number must be subtracted from each term of the ratio 17: 33 so that the ratio becomes 7: 15?

Solution:-

Let the number be x,

Then the two term becomes,

$= (17 - x): (33 - x) = 7: 15$

$= (17 - x) / (33 - x) = (7/15)$

By cross multiplication,

$= 15 \times (17 - x) = 7 \times (33 - x)$

$= 255 - 15x = 231 - 7x$

Transposing -15x to RHS and 231 to LHS

$= 255 - 231 = 15x - 7x$

$= 8x = 24$

$= x = (24/8)$

$= x = 3$

Hence, the number be subtracted from each term of the ratio 17:33 to make the ratio 7: 15 is 3

12. Two number are in the ratio 7: 11. If 7 is added to each of the numbers, the ratio becomes 2: 3. Find the numbers.

Solution:-

Let the numbers are 7x and 11x,

Then,

$= (7x + 7): (11x + 7) = 2: 3$

$= (7x + 7)/ (11x + 7) = (2/3)$

By cross multiplication,

$= 3 \times (7x + 7) = 2 \times (11x + 7)$

$= 21x + 21 = 22x + 14$

Transposing 21x to RHS and 14 to LHS

$= 21 - 14 = 22x - 21$

$= x = 7$

Hence the numbers are $7x = 7 \times 7 = 49$

$11x = 11 \times 7 = 77$

EXERCISE 8B PAGE: 128

1. **Show that 30, 40, 45, 60 are in proportion.**
   Solution:-
   Four numbers a, b, c, d are said to be in proportion, if a: b = c: d we write a: b:: c: d.
   Let,
   a = 30, b = 40, c = 45, d = 60,
   Then,
   Product of extremes = (30 × 60) = 1800
   Product of means = (40 × 45) = 1800
   ∴ Product of extremes = product of means
   Hence, 30, 40, 45, 60 are in proportion.

2. **Show that 36, 49, 6, 7 are not in proportion.**
   Solution:-
   Four numbers a, b, c, d are not in proportion, if a: b ≠ c: d
   Let,
   a = 36, b = 49, c = 6, d = 7,
   Then,
   Product of extremes = (36 × 7) = 252
   Product of means = (49 × 6) = 294
   ∴ Product of extremes ≠ product of means
   Hence, 30, 40, 45, 60 are not in proportion.

3. **If 2: 9:: x: 27, find the value of x,**
   Solution:-
   It is given that 2: 9:: x: 27
   But, product of extremes = product of means
   ∴ 2 × 27 = 9 × x
   = 54 = 9x
   = x = 54/9
   = x = 6
   Hence, x = 6

4. **If 8: x:: 16: 35, find the value of x,**
   Solution:-
   It is given that 8: x:: 16: 35
   But, product of extremes = product of means
   ∴ 8 × 35 = x × 16
   = 280 = 16x
   = x = 280/16
   = x = 17.5
   Hence, x = 17.5

5. **If x: 35:: 48: 60, find the value of x,**
   Solution:-
   It is given that x: 35:: 48: 60
   But, product of extremes = product of means
   ∴ x × 60 = 35 × 48
   = 60x = 1680
   = x = 1680/60
   = x = 28
   Hence, x = 28

6. **Find the fourth proportional to the numbers:**
   i. **8, 36, 6**
   Solution:-
   Let the fourth number be x
   Then,
   = 8: 36:: 6: x
   We know that,
   Product of extremes = product of means
   ∴ 8 × x = 36 × 6
   = 8x = 216
   = x = 216/8
   = x = 27
   Hence, x = 27

   ii. **5, 7, 30**
   Solution:-
   Let the fourth number be x
   Then,
   = 5: 7:: 30: x
   We know that,
   Product of extremes = product of means
   ∴ 5 × x = 7 × 30
   = 5x = 210
   = x = 210/5
   = x = 42
   Hence, x = 42

   iii. **2.8, 14, 3.5**
   Solution:-
   Let the fourth number be x
   Then,
   = 2.8: 14:: 3.5: x

We know that,
Product of extremes = product of means
$\therefore 2.8 \times x = 14 \times 3.5$
$= 2.8x = 49$
$= x = 49/2.8$
$= x = 17.5$
Hence, x = 17.5

7. If 36, 54,x are in continued proportion, find the value of x.
Solution:-
Since 25, 35, x are in continued proportion, we have:
= 36: 54 :: 54: x
We know that,
Product of extremes = product of means
$= 36 \times x = 54 \times 54$
$= 36x = 2916$
$= x = (2916/36)$
$= x = 81$

EXERCISE 8C PAGE: 128

Mark against the correct answer in each of the following:

1. **If a:b = 3:4 and b:c = 8:9, then a:c = ?**
   (a)1:2 (b)3:2 (c)1:3 (d)2:3
   Solution:-
   (d)2:3
   Because,
   a: b = 3: 4 and b: c = 8: 9
   = (a/b) = (3/4) and (b/c) = (8/9)
   = (a/b) × (b/c) = (3/4) × (8/9)
   = (a/c) = (2/3)
   Hence, a: c = 2:3

2. **If A: B = 2: 3 and B: C = 4: 5, then C: A =?**
   (a)15: 8 (b)6: 5 (c)8: 5 (d)8: 15
   Solution:-
   (a)15: 8
   Because,
   A: B = 2: 3 AND B: C = 4: 5
   = (A/B) = (2/3) and (B/C) = (4/5)
   = (A/B) × (B/C) = (2/3) × (4/5)
   = (A/C) = (8/15)
   = (C/A) = (15/8)
   Hence, c: a = 15:8

3. **If 2A = 3B and 4B = 5C, then A: C =?**
   (a)4: 3 (b)8: 15 (c)3: 4 (d)15: 8
   Solution:-
   (d)15: 8
   Because,
   = A = 3B/2
   = C = 4B/5
   Then,
   = A: C = (3B/2): (4B/5)
   = (A/C) = (3B/2)/ (4B/5)
   = (A/C) = (3B/2) × (5/4B)
   = (A/C) = (15/8)
   = A: C = 15: 8

4. **If 15% of A = 20% of B, then A: C=?**
   (a)3: 4 (b)4: 3 (c)17: 16 (d)16: 17
   Solution:-

(a)3: 4
Because,
15% of A = 20% of B
= (15/100)A = (20/100)B
= (A/B) = (15/100)/(20/100)
= (A/B) = (15/100) × (100/20)
= (A/B) = (3/4)

5. **If A= (1/3)B and B= (1/2)C, then A: B: C=?**
(a)1: 3: 6 **(b)2: 3: 6** **(c)3: 2: 6** **(d)3: 1: 2**
Solution:-
(a)1: 3: 6
Because,
From the question,
= A= (1/3)B
= C = 2B
A: B: C = (1/3)B: B: 2B
A: B: C = 1: 3: 6

6. **If A: B= 5: 7 and B: C= 6: 11, then A: B: C=?**
(a)30: 42: 55 **(b)30: 42: 77** **(c)35: 49: 66** **(d)none of these**
Solution:-
(b)30: 42: 77
Because,
A: B = 5: 7 and B: C = 6: 11
HCF of 5 and 7 is 1
= (5/7)
Then,B: C= (6 ÷ 6)/ (11 ÷ 6)
B: C = 1: (11/6)
B: C = 7: (77/6) … [Multiply both by 7 we get]
∴ A: B: C = 5: 7: (17/6)
A: B: C = 30: 42: 77

7. **If 2A = 3B = 4C, then A: B: C=?**
(a)2: 3: 4 **(b)4: 3: 2** **(c)6: 4: 3** **(d)3: 4: 6**
Solution:-
(c)6: 4: 3
Because,
Let 2A=3B=4C=k
= A= (k/2), B=(K/3), C=(k/4)
= A: B: C= (K/2): (K/3): (K/4)
LCM of 2, 3 and 4 is12
= [(K/2) ×12]: [(K/3) ×12]: [(K/4) ×12]

= 6: 4: 3

Hence, A: B: C = 6: 4: 3

8. If (A/3) = (B/4)= (C/5), then A: B: C=?

(a)3: 4: 5 (b)4: 3: 2 (c)5: 4: 3

Solution:-

(a)3: 4: 5

Because,

Let (A/3) = (B/4) = (C/5) =k

= A = 3k, B=4k, C=5k

= A: B: C= 3K: 4K: 5K

A: B: C = 3: 4: 5

9. If (1/x): (1/y): (1/z) = 2: 3: 5, then x: y: z=?

(a)2: 3: 5 (b)15: 10: 6 (c)5: 3: 2 (d)6: 10: 15

Solution:-

(b)15: 10: 6

Because,

= (1/x): (1/y) = 2: 3

Then, y : x = 2: 3

y = (2/3)x

= (1/y) : (1/z) = 3: 5

= z: y =3: 5

z = (3/5)y

x: y: z = x: (2/3)x: (3/5)y

= x: (2/3)x: (3/5) × (2/3)x

= x: (2/3)x: (2/5)x

= 15: 10: 6

10. If x: y: = 3: 4, then, (7x + 3y): (7x-3y) =?

(a)4:3 (b)5:2 (c)11: 3 (d)37: 39

Solution:-

(c)11: 3

Because,

= x: y: = 3: 4

= (x/y) = (3/4) ... [equation 1]

∴ (7x + 3y): (7x-3y) = (7x + 3y)/ (7x-3y)

= [7(x/y)+3] / [7(x/y) – 3)] ... [on dividing numerator and denominator by y]

= [7(3/4) + 3]/ [7(3/4) – 3)] ... [by using equation 1]

= [(21/4) + 3]/ [(21/4) -3]

= (33/4) / (9/4)

= (33/4) × (4/9)

= (11/3)