EXERCISE 6B

1. Check whether the following quantities form a proportion or not:
(i) 3x, 7x, 24 and 56
(ii) 0.8, 3, 2.4 and 9
(iii) 1 ½, 3 ¼, 4 1/2 and 9 ¾
(iv) 0.4, 0.5, 2.9 and 3.5
(v) 2 ½, 5 ½, 3.0 and 6.0
Solution:

(i) 3x, 7x, 24 and 56
If the quantities are in proportion
3x × 56 = 7x × 24
By further calculation
168x = 168x which is true
Therefore, 3x, 7x, 24 and 56 are in proportion.

(ii) 0.8, 3, 2.4 and 9
If the quantities are in proportion
0.8 × 9 = 3 × 2.4
By further calculation
7.2 = 7.2 which is true
Therefore, 0.8, 3, 2.4 and 9 are in proportion.

(iii) 1 ½, 3 ¼, 4 1/2 and 9 ¾
If the quantities are in proportion
1 ½ × 9 ¾ = 3 ¼ × 4 ½
By further calculation
3/2 × 39/4 = 13/4 × 9/2
117/8 = 117/8 which is true
Therefore, 1 ½, 3 ¼, 4 1/2 and 9 ¾ are in proportion.

(iv) 0.4, 0.5, 2.9 and 3.5
If the quantities are in proportion
0.4 × 3.5 = 0.5 × 2.9
By further calculation
1.40 = 1.45 which is not true
Therefore, 0.4, 0.5, 2.9 and 3.5 are not in proportion.

(v) 2 ½, 5 ½, 3.0 and 6.0
If the quantities are in proportion
2 ½ × 6.0 = 5 ½ × 3.0
By further calculation
5/2 × 6.0 = 11/2 × 3.0
30/2 = 33/2 which is not true
Therefore, 2 ½, 5 ½, 3.0 and 6.0 are not in proportion.

2. Find the fourth proportional of:
(i) 3, 12 and 4
(ii) 5, 9 and 45

(iii) 2.1, 1.5 and 8.4
(iv) 1/3, 2/5 and 8.4
(v) 4 hours 40 minutes, 1 hour 10 minutes and 16 hours
Solution:

(i) 3, 12 and 4
Here the 4th proportional = (12 × 4)/ 3 = 16

(ii) 5, 9 and 45
Here the 4th proportional = (9 × 45)/ 5 = 81

(iii) 2.1, 1.5 and 8.4
Here the 4th proportional = (1.5 × 8.4)/ 2.1 = 1.5 × 4 = 6.0

(iv) 1/3, 2/5 and 8.4
Here the 4th proportional = (2/5 × 8.4)/ 1/3
By further calculation
= 2/5 × 8.4 × 3/1
So we get
= (2 × 84 × 3)/ (5 × 10 × 1)
= 252/25
= 10.08

(v) 4 hours 40 minutes, 1 hour 10 minutes and 16 hours
It can be written as
4 hours 40 minutes = 4 × 60 + 40 = 240 + 40 = 280 minutes
1 hour 10 minutes = 1 × 60 + 10 = 60 + 10 = 70 minutes
16 hours = 16 × 60 = 960 minutes
So the fourth proportional = (70 × 960)/ 280 = 240 minutes
We get
= 240/60
= 4 hours

3. Find the third proportional of:
(i) 27 and 9
(ii) 2 m 40 cm and 40 cm
(iii) 1.8 and 0.6
(iv) 1/7 and 3/14
(v) 1.6 and 0.8
Solution:

(i) 27 and 9
Here the 3rd proportional = (9 × 9)/ 27 = 3

(ii) 2 m 40 cm and 40 cm
It can be written as
240 cm and 40 cm
Here the 3rd proportional = (40 × 40)/ 240 = 20/3 = 6 2/3 cm

(iii) 1.8 and 0.6

Here the 3rd proportional = (0.6 × 0.6)/ 1.8 = 0.36/ 1.8
Multiplying by 100
= 36/ 180
So we get
= 1/5
= 0.2

(iv) 1/7 and 3/14
Here the 3rd proportional = (3/14 × 3/14)/ 1/7
By further calculation
= 9/196 × 7/1
So we get
= 9/28

(v) 1.6 and 0.8
Here the 3rd proportional = (0.8 × 0.8)/ 1.6 = 0.64/1.6
By further calculation
= 64/160
= 2/5
= 0.4

4. Find the mean proportional between:
(i) 16 and 4
(ii) 3 and 27
(iii) 0.9 and 2.5
(iv) 0.6 and 9.6
(v) ¼ and 1/16
Solution:

(i) 16 and 4
Here the mean proportional between them
= √ (16 × 4)
By multiplication
= √ 64
= 8

(ii) 3 and 27
Here the mean proportional between them
= √ (3 × 27)
By multiplication
= √ 81
= 9

(iii) 0.9 and 2.5
Here the mean proportional between them
= √ (0.9 × 2.5)
Multiplying and dividing by 10
= √ (9/10 × 25/10)
So we get
= √ 225/100

= 15/10
= 1.5

(iv) 0.6 and 9.6
Here the mean proportional between them
= √ (0.6 × 9.6)
Multiplying and dividing by 10
= √ 6/10 × 96/10
So we get
= √ 576/100
= 24/10
= 2.4

(v) ¼ and 1/16
Here the mean proportional between them
= √ (1/4 × 1/16)
So we get
= √ 1/64
= 1/8

5. (i) If A: B = 3: 5 and B: C = 4: 7, find A: B: C.
(ii) If x: y = 2: 3 and y: z = 5: 7, find x: y: z.
(iii) If m: n = 4: 9 and n: s = 3: 7, find m: s.
(iv) If P: Q = ½: 1/3 and Q: R = 1 ½: 1 1/3, find P: R.
(v) If a: b = 1.5: 3.5 and b: c = 5: 6, find a: c.
(vi) If 1 ¼: 2 1/3 = p: q and q: r = 4 ½: 5 ¼, find p: r.
Solution:

(i) A: B = 3: 5
Now divide by 5
= 3/5: 1
Similarly
B: C = 4: 7
Now divide by 4
= 1: 7/4
So we get
A: B: C = 3/5: 1: 7/4
Multiplying by 5 × 4 = 20
A: B: C = 12: 20: 35

(ii) x: y = 2: 3
Now divide by 3
= 2/3: 1
Similarly
y: z = 5: 7
Now divide by 5
= 1: 7/5
So we get
x: y: z = 2/3: 1: 7/5
Multiplying by 3 × 5 = 15

x: y: z = 10: 15: 21

(iii) m: n = 4: 9
We can write it as
m/n = 4/9
Similarly n: s = 3: 7
We can write it as
n/s = 3/7
So we get
m/n × n/s = 4/9 × 3/7
Here
m/s = 4/21
m: s = 4: 21

(iv) P: Q = 1/2: 1/3
It can be written as
P/Q = 1/2 × 3/1 = 3/2
Similarly
Q: R = 1 1/2: 1 1/3 = 3/2: 4/3
It can be written as
Q/R = 3/2 × 3/4 = 9/8
So we get
P/Q × Q/R = 3/2 × 9/8
P/R = 27/16
P: R = 27: 16

(v) a: b = 1.5: 3.5
It can be written as
a/b = 1.5/ 3.5 = 15/35 = 3/7
We know that
b: c = 5: 6
It can be written as
b/c = 5/6
So we get
a/b × b/c = 3/7 × 5/6
By further calculation
a/c = 5/14
a: c = 5: 14

(vi) p: q = 1 ¼: 2 1/3
We can write it as
= 5/4: 7/3
We get
p/q = 5/4 × 3/7 = 15/28
Similarly
q: r = 4 1/2: 5 1/4 = 9/2: 21/4
We can write it as
q/r = 9/2 × 4/21 = 6/7
So we get
p/q × q/r = 15/28 × 6/7

p/r = 45/98
p: r = 45: 98

6. If x: y = 5: 4 and 2: x = 3: 8, find the value of y.
Solution:

It is given that
x: y = 5: 4 and 2: x = 3: 8
We can write it as
x/y = 5/4 …. (1)
2/x = 3/8 ….. (2)
x = (2 × 8)/ 3 = 16/3
Substituting the value of x in equation (1)
x/ y = 5/4
We get
y = x × 4/5
y = 16/3 × 4/5 = 64/15 = 4 4/15

7. Find the value of x, when 2.5: 4 = x: 7.5.
Solution:

It is given that
2.5: 4:: x: 7.5
We can write it as
4 × x = 2.5 × 7.5
x = (2.5 × 7.5)/ 4
Now multiplying by 100
x = (25 × 75)/ (4 × 100)
By further calculation
x = 75/16 = 4 11/16

8. Show that 2, 12 and 72 are in continued proportion.
Solution:

Consider a, b and c as the three numbers in continued proportion where a: b:: b: c
So the numbers are 2, 12 and 72
a/b = 2/12 = 1/6
b/c = 12/72 = 1/6
We get a/b = b/c

Hence, 2, 12 and 72 are in continued proportion.