Chapter 8 – Ratio and Proportion

Exercise 8.1 – Ratios

1. Find the ratio in lowest terms:

(i) ₹75 and 80 → 75:80 = 15:16
(ii) ₹55 and 15.40 → convert to paise: 5500:1540 = 25:7
(iii) 120 kg and 150 kg → 120:150 = 4:5
(iv) 150 g and 2 kg → 150:2000 = 3:40
(v) 2 hours 30 minutes and 50 minutes → 150:50 = 3:1
(vi) 20 hours and 1 day → 20:24 = 5:6

2. Divide ₹1,080 in ratio 5:7
Total parts = 12 → One part = 1080 ÷ 12 = 90
A = 5 × 90 = ₹450, B = 7 × 90 = ₹630

3. Divide 24 chocolates in ratio 5:3
Total parts = 8 → One part = 24 ÷ 8 = 3
Jaya = 5 × 3 = 15, Mansi = 3 × 3 = 9

4. Divide 20 bananas in ratio 2:2:1
Total parts = 5 → One part = 20 ÷ 5 = 4
John = 2 × 4 = 8, Rahul = 2 × 4 = 8, Jafar = 1 × 4 = 4

5. Divide 80 in ratio 5:2:1
Total parts = 8 → One part = 80 ÷ 8 = 10
Sheela = 50, Sudha = 20, Sharda = 10

6. Income ₹18,200, expenditure ₹11,700, savings = ₹6,500
(i) Expenditure:Savings = 11700:6500 = 9:5
(ii) Income:Expenditure = 18200:11700 = 14:9
(iii) Savings:Income = 6500:18200 = 5:14

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7. Boys:Girls = 5:4, Total = 540
Total parts = 9 → One part = 540 ÷ 9 = 60
Boys = 5 × 60 = 300, Girls = 4 × 60 = 240

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8. Rectangle perimeter = 80 cm, L:B = 5:3
L + B = 40 → Let L=5k, B=3k → 8k=40 → k=5
Length = 25 cm, Breadth = 15 cm

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9. Alloy Copper:Zinc = 2:1, Total = 4.8 kg
Zinc = 1/3 × 4.8 = 1.6 kg

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10. Triangle perimeter = 50 cm, sides ratio 2:3:5
Total parts = 10 → One part = 50 ÷ 10 = 5
Sides = 2×5=10 cm, 3×5=15 cm, 5×5=25 cm

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11. Angles ratio 2:5:2
Total parts = 9 → One part = 180 ÷ 9 = 20°
Angles = 2×20=40°, 5×20=100°, 2×20=40°

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12. Which ratio is greater?
(i) 3:7 vs 5:11 → 5:11 is greater
(ii) 5:9 vs 3:7 → 5:9 is greater
(iii) 8:11 vs 5:6 → 5:6 is greater
(iv) 8:3 vs 5:2 → 8:3 is greater

Exercise 8.2 – Proportion

1. Are 5, 6, 15, 18 in proportion?
5:6::15:18 → 5×18=6×15 → Yes

2. Are 35, 49, 5, 8 in proportion?
35×8 ≠ 49×5 → No

3. Are 16, 18, 24, 18 in proportion?
16×18 ≠ 18×24 → No

4. Find x
(i) 5:7::15:x → x = 15×7÷5 = 21
(ii) 8:7::x:21 → x = 8×21÷7 = 24
(iii) 7:x::3:6 → x = 14
(iv) x:9::28:36 → x = 7

5. Rashmi and Sangeeta weight ratio 5:7, Rashmi = 50 kg
One part = 50÷5=10 → Sangeeta = 7×10=70 kg

6. Girls:Boys = 7:8, Boys = 368 → Girls = 7×(368÷8)=322

7. Park L:B = 7:4, L = 56 m → B = 32 m

8. Metals A:B = 5:8, A = 91 g → B = 8×(91÷5)=145.6 g

9. 8 books = 96 → 15 books = 15×(96÷8)=180

10. 25 kg wheat = 200 → 35 kg = 35×(200÷25)=280

11. 4 washing machines = 34160 → 9 machines = 9×(34160÷4)=76860

12. Man walks 90 km in 5 days → 11 days = 11×(90÷5)=198 km

13. Car consumes 5 L → 85 km → 17 L = 17×(85÷5)=289 km

14. 15 men → 12 days → 20 men → 12×15/20 = 9 days

15. 18 men → 25 days → 10 days → 18×25/10 = 45 men

16. 32 men → 24 days → 16 days → 32×24/16 = 48 men

17. 160 men → 27 days → 180 men → 4320/180=24 days

Exercise 8.3 – Speed, Price, and Work Problems

1. MCQs
(i) 10 shirts × 500 = 5000 → (b) 5000
(ii) 5 persons × 2 days → 10 persons → 1 day
(iii) 3 kg rice → 20 persons → 50 persons → 3×50÷20=7.5 kg

2. Train 360 km in 3 h 20 min → speed = 108 km/h → 90 km → 90÷108=0.833 h = 50 min

3. Oranges 24 for ₹40 → ₹50 → 24×50/40=30 oranges

4. 1 dozen pens = ₹60 → 60 pens = 60÷12×60=300

5. 15 oranges = ₹40 → 36 oranges = 36×40/15=96

6. 38 kg rice = 275.50 → per kg = 275.50/38=7.25 → 20 kg = 145

7. 12 kg wheat = 108 → per kg = 9 → ₹144 → 16 kg

8. 10 persons × 20 hours = 200 man-hours → 5 hours → 200/5=40 persons

9. Rakesh 10 pens = 55 → 5.5 per pen, Raju 2 pens = 13 → 6.5 → Raju paid more

10. First bus 36 km/0.5 h = 72 km/h, Second 120/2=60 km/h → First is faster

Exercise 8.4 – Speed, Distance, Time

1. Karan runs 200 m in 20 s → speed = 200/20 = 10 m/s → 36 km/h

2. Bus 428.5 km in 8 h → 428.5/8 = 53.56 km/h

3. Car 26 km/h → 5 h → distance = 26×5=130 km

Miscellaneous Exercise

1. Ratios
(i) 50:11.50 → 1:23
(ii) 40.500 kg:20.400 kg → 135:68
(iii) 45 cm:2 m → 9:40
(iv) 15 L:500 ml → 30:1

2. Divide 980 in ratio 3:11 → Charan = 210, Pawan = 770

3. 25 chocolates in ratio 3:2 → Ratan = 15, Aadil = 10

4. 35 pencils in ratio 2:1:4 → Raja=10, Mahesh=5, Naresh=20

5. Angles ratio 2:3:4 → 40°, 60°, 80°

6. Perimeter 24 cm, sides ratio 2:3:1 → 8 cm, 12 cm, 4 cm

7. Which ratio is greater?
(i) 5:4 vs 7:6 → 5:4 greater
(ii) 3:5 vs 5:6 → 5:6 greater

8. Find x
(i) Missing info
(ii) x:78 = 8:4 → x = 156

9. Girls:Boys = 3:4, Boys = 560 → Girls = 420

10. 8 inkpots = 96 → 27 inkpots = 324

11. Are 3,2,21,14 in proportion? → Yes

12. Incomes A:B = 5:7, A = 4200 → B = 5880

13. 8 men → 9 days → 12 days → 6 men

14. 15 men → 50 days → 10 days → 75 men

15. Car 548 km in 9 h → 60.89 km/h

16. Coding: PROPORTION = 6850586954

Chapter Test – Step-by-Step Solutions

1. Ratios:
(i) 50.40:40.80 → 5040:4080 → 6:5
(ii) 50 kg:45 kg → 50:45 → 10:9

2. Divide 720 in ratio 4:3:2 → total parts=9 → one part=80 → A=320,B=240,C=160

3. Angles ratio 5:3:1 → sum=9 → one part=180/9=20 → angles=100°,60°,20°

4. Smaller ratio:
(i) 5:7 vs 3:4 → 5/7=0.714,3/4=0.75 → 5:7 smaller
(ii) 3:8 vs 7:20 → 3/8=0.375,7/20=0.35 → 7:20 smaller

5. Income ₹8250, Savings ₹2250 → Expenditure=6000
(i) Savings:Expenditure=2250:6000=3:8
(ii) Savings:Income=2250:8250=3:11
(iii) Income:Expenditure=8250:6000=11:8

6. Copper:Gold=3:4, Total=10.5 → Gold=4/7×10.5=6 kg

7. Cyclist A=72/9=8 km/h, B=165/15=11 km/h → ratio=8:11

8. 5:3::20:x → x=12

9. Male:Female=7:9, Male=28 → Female=28×9/7=36

10. Rama:Shama=5:9, Rama=4500 → Shama=4500×9/5=8100

11. Rod 7 m → 63 kg → 11 m → 63×11/7=99 kg

12. 11 fans=10373 → 8 fans=10373×8/11=7544.73

13. Car 270 km/15 L → 9 L → 270×9/15=162 km

14. 32 men → 18 days → 24 days → 32×18/24=24 men

15. Train 60 km/h → 9 h → distance=540 km → 45 km/h → time=540/45=12 h

16. 1 dozen pens=50 → 72 pens → 72/12×50=300

17. Train 738 km/9 h → speed=738/9=82 km/h