10 Ratio and Proportion

EXERCISE 10A

For SSC GD and MTS Exams

1. A certain sum is divided among A, B, C and D such that B's share is $\frac{1}{3}$ of A'share, C's share is 40% of B's share, and D's Share is 50% of C's share. If the difference between the shares of B and D is ₹1,600, then the sum is:
SSC MTS 13/10/2021 (Shift-1)
(a) ₹9,600 (b) ₹9,400 (c) ₹9,000 (d) ₹9,200

2. If x is subtracted from each of 52, 47, 20 and 19, the numbers so obtained in this order are in proportion. What is the mean proportional between (x + 13) and (x - 8)?
SSC MTS 13/10/2021 (Shift-1)
(a) 12 (b) 10 (c) 15 (d) 9

3. The ratio of the monthly income and expenditure of Dinesh is 17:14, and his monthly savings are ₹12,000. If his monthly income is increased by ₹10,000 and expenditure is decreased by ₹2,000, then the new ratio of his income and expenditure is:
SSC MTS 12/10/2021 (Shift-3)
(a) 13:8 (b) 13:9 (c) 11:9 (d) 11:7

4. Three numbers are in the ratio of $\frac{1}{4}:\frac{1}{5}:\frac{1}{3}$.The difference between the greatest and the smallest number is 800 The sum of the three numbers is:
SSC MTS 12/10/2021 (Shift-3)
(a) 4500 (b) 5800 (c) 5700 (d) 4700

5. A man ordered 10 physics books and some chemistry books. The price of a chemistry book is twice the price of a Physics book. While preparing the bill the clerk interchanged the number of physics and chemistry books by mistake, which decreased the bill by $12\frac{1}{2}$ %. The ratio of the number of physics books to the number of chemistry books in the original order is:
SSC MTS 12/10/2021 (Shift-3)
(a) 3:5 (b) 3:4 (c) 4:5 (d) 2:3

6. The incomes of A and B are in the ratio 3: 4, and their expenditures are in the ratio 9:5. If the income of A is equal to three times the expenditure of B, then what is the ratio of the savings of A an B?
SSC MTS 12/10/2021 (Shift-1)
(a) 5:2 (b) 3:5 (c) 5:3 (d) 2:5

7. An amount is distributed among A, B and C in the ratio of 5:6:7. If B gives 400 rs from his money to C then the ratio becomes 2:3:4. Find the sum of amount which A and C have in the starting.
SSC MTS 12/10/2021 (Shift-1)
(a) 7,200 (b) 14,000 (c) 8,400 (d) 11,200

8. Two numbers are, respectively, 17% and 50%, more than a third number. The ratio of the two numbers is:
SSC MTS 12/10/2021 (Shift-1)
(a) 39:50 (b) 50:39 (c) 59:39 (d) 39:59

9. Renuka got $1\frac{1}{2}$ times as many marks in Mathematics as in English. Her total marks in Mathematics, English and Science are 190. If the ratio of the marks in Mathematics and Science is 2:3, find her Science marks.
SSC MTS 11/10/2021 (Shift-3)
(a) 92 (b) 90 (c) 85 (d) 88

10. If a number of pens and pencils are bought in the ratio of 5:3, then Ashok has to pay ₹44. If the ratio is changed as 3:5, then he has to pay ₹36. Find the ratio of the price of one pen to one pencil.
SSC MTS 11/10/2021 (Shift-3)
(a) 5:3 (b) 7:3 (c) 8:5 (d) 7:4

11. Instead of dividing ₹3,910 among P,Q and R in the ratio $\frac{1}{4}:\frac{1}{5}:\frac{1}{8}$ by mistake it was divided in the ratio 4:5:8. By how much did R gain in this transaction?
SSC MTS 11/10/2021 (Shift-2)
(a) ₹990 (b) ₹940 (c) ₹890 (d) ₹900

12. Twelve years ago, the ratio of the ages of Anil and Bishu was 5:12. Eight years from now, the ratio of their ages will be 10:17. What is the ratio of the present ages of Anil and Bishu?
SSC MTS 11/10/2021 (Shift-2)
(a) 9:16 (b) 8:15 (c) 5:8 (d) 7:13

13. Seats in a college for a B.Sc. course for Physics, Chemistry and Biology, are in the proportion 7:5:8. There is a proposal to increase these seats by 50%, 40% and 25%, respectively. What will be the proportion of increased seats?
SSC MTS 11/10/2021 (Shift-1)
(a) 12:9:33 (b) 21:14:20 (c) 57:45:33 (d) 7:4:4

14. A sum of ₹7,560 is divided between A, B, C and D such that the ratio of the shares of A and B is 4:5, that of B and C is 3:4 and that of C and D is 5:7.What is the difference (in ₹) between the shares of B and D?
SSC MTS 08/10/2021 (Shift-3)
(a) 1,612.80 (b) 1,310.40 (c) 806.40 (d) 1,209.60

15. If (a+b):(b+c):(c+a) = 7:4:5, and a+b+c=16, then $(a^2 + b^2 + c^2):(ab + bc + ca)$ is equal to:
SSC MTS 08/10/2021 (Shift-3)
(a) 24:17 (b) 26:19 (c) 27:20 (d) 23:15

16. If (a+b):(b+c):(c+a) = 15:14:11, and a+b+c= 40, then what is the value of (3a + b - 4c)?
SSC MTS 08/10/2021 (Shift-2)
(a) 18 (b) 17 (c) 15 (d) 14

17. A sum of ₹12,384 is divided between A, B, C and D such that the ratio of the shares of A and B is 3:4, that of B and C is 5:6 and that of C and D is 8:9. What is the share of C?
SSC MTS 08/10/2021 (Shift-2)
(a) ₹2,880 (b) ₹3,888 (c) ₹3,456 (d) ₹2,160

18. A sum of ₹2,130 is to be divided into three equal parts. The second part is 60% of the first, and the ratio of the first to third part is 5:7. What are the parts (in ₹)?
SSC MTS 8/10/2021 (Shift-1)
(a) 426, 710, 99 (b) 710, 426, 994
(c) 994, 710, 426 (d) 710, 994, 426

19. When x is subtracted from each of 21, 22, 60 and 64, the numbers obtained in this order are in proportion. What is mean proportional between (x+4) and $(\frac{x}{2}-1)$?
SSC MTS 7/10/2021 (Shift-3)
(a) 8 (b) 5 (c) 6 (d) 12

20. A sum of money is distributed among P, Q, R and S in the ratio 3:4:5:6, respectively. If R gets ₹2500 more than P, then the sum of all their shares (in ₹) is:
SSC MTS 7/10/2021 (Shift-3)
(a) 6,000 (b) 4,500 (c) 7,500 (d) 5,000

21. A sum of ₹x is divided among A, B and C such that the ratio of the shares A and B is 7:12 and that of B and C is 8:5. If the difference in the shares of A and C is 219, then what is the value of x?
SSC MTS 7/10/2021 (Shift-2)
(a) 17,231 (b) 15,321
(c) 11,607 (d) 21,901

22. The ratio of the present ages of A and B is 6:5. Four years ago, this ratio was 5:4. What will be the ratio of the ages of A and B after 10 years?
SSC MTS 7/10/2021 (Shift-2)
(a) 11:15 (b) 17:15
(c) 15:11 (d) 15:17

23. The sum of three numbers is 396. If the ratio between the first and the second number is 7:11 and that between the second and the third number is 11:15, then the difference between the first and the third number is:
SSC MTS 7/10/2021 (Shift-1)
(a) 86 (b) 94
(c) 96 (d) 85

24. A, B and C are three boxes containing marbles in the ratio 3:5:7, and the total number of marbles is 75. If 3 marbles are transferred from B to A, and 5 marbles are transferred from C to B, then the new ratio of the marbles is:
SSC MTS 7/10/2021 (Shift-1)
(a) 6:8:11 (b) 5:6:7 (c) 7:9:10 (d) 6:9:10

25. Out of two numbers, the first number is three-fourth of the second number. If the average of the reciprocals of the two numbers is $\frac{7}{72}$ then the sum of the two numbers is:
SSC MTS 7/10/2021 (Shift-1)
(a) 21 (b) 22
(c) 25 (d) 20

26. Two numbers are in the ratio 7:9, If the sum of their squares is 8320, then the sum of the two numbers is:
SSC MTS 7/10/2021 (Shift-1)
(a) 128 (b) 228
(c) 120 (d) 124

27. A sum of ₹3,780 is divided between A, B and C such that if their shares are decreased by ₹130, ₹150 and ₹200, respectively, then they are in the ratio of 5:2:4. What is the original share of C?
SSC MTS 6/10/2021 (Shift-3)
(a) ₹1,350 (b) ₹1,330
(c) ₹1,400 (d) ₹1,430

28. The ratio of A and B is 2:3, and B is 8 more than A. If a certain number *k* is added to each of A and B, then the ratio becomes 7:9. The value of *k* is:
SSC MTS 6/10/2021 (Shift-3)
(a) 10 (b) 8
(c) 12 (d) 16

29. A sum of ₹4,095 is divided between A, B, C and D such that the ratio of the shares of A and B is 1:3, that of B and C is 2:5 and that of C and D is 2:3. What is the difference (in ₹) between the shares of B and D?
SSC MTS 6/10/2021 (Shift-2)
(a) 1,440 (b) 1,485
(c) 1,530 (d) 1,845

SOLUTIONS

1. (d) $\frac{B}{A}=\frac{1}{3}$ $\frac{C}{B}=\frac{2}{5}$ $\frac{D}{C}=\frac{1}{2}$

A	B	C	D	
3	1 →	1 →	1	
5 ←	5	2 →	2	
2 ←	2 ←	2	1	
30	10	4	2	= 46

8 = ₹1600 × 200
1 = 200 ₹9200

2. (b) $(52 - x) : (47 - x) :: (20 - x) : (19 - x)$
$940 - 67x - x^2 = 988 - 71x - x^2$
$4x = 48$
$x = 12$
$x + 13 = 25$, $x - 8 = 4$
mean proportional = $\sqrt{25} \times \sqrt{4} = 5 \times 2 = 10$

3. (b)

	Income	Expenditure
	17	14
	3 = 12000 ₹	
x 4000	1 = 4000	x 4000
₹68000		₹56000
+ 10000		− 2000
78000		54000

I : E = 78000 : 54000
= 13 : 9

4. (d) $\frac{1}{4}:\frac{1}{5}:\frac{1}{3} \Rightarrow 15 : 12 : 20$
8 = 800
1 = 100
15 + 12 + 20 = 47
× 100
4700

5. (d) $12\frac{1}{2}\% = \frac{1}{8} = \frac{7}{8}$

	P	C		P	C
No. of books	10	N		10	N
Rate	1	2		2	1
	10	2N	= (10 + 2N) × 7	20	N	= (20 + N) 8

(10 + 2N) 7 = (20 + N) 8

N = 15

P : C = 10 : 15 = 2:3

6. (d)

	A	B
Income	$3_{x5} = 15$	$4_{x5} = 20$
	× 3 ↘	
Expenditure	9	5
Saving	6	15

6 : 15

2 : 5

7. (d)

A	B	C	
5	$6_{x4} = 24$	$7_{x3} = 21$	3 = 2800
2	3	4	$1 = \frac{2800}{3}$
	↓ × 400	↓ × 400	
	1200	1600	
	2800		

$A + C = 12 \times \frac{2800}{3}$

A + C = 11200₹

8. (a)

I	III	II
117	100	
	100	150
117	100	150

I : II = 117 : 150

= 39:50

9. (b) $1\frac{1}{2} = \frac{3}{2} \rightarrow \frac{M}{E}$ M : S = 2 : 3

E	M	S	
2	3 →	3	
2 ←	2	3	
4	6	9	⇒ 19 = 190
			1 = 10
			× 10

90 marks

10. (b)

Pens	Pencils	Rs	
(5	3	44)	×3
(3	5	36)	× 5
Pens	Pencils	Rs	
15	9) 16	132)	48
15	25)	180)	

16 = 48 ₹

1 = 3 ₹ (pencil)

$\text{Pen} = \frac{132 - 27}{15} = 7$ ₹

Pen : Pencil = 7 : 3

11. $\frac{1}{4} : \frac{1}{5} : \frac{1}{8}$ P Q R = 10 : 8 : 5 ⇒ ~~3910~~ ~~23~~ 170

× 170

850

P Q R

4 : 5 : 8 ⇒ 17 = 3910

1 = 230

× 230

1840

Grain of R = 990 ₹

12. (b)

	Anil	Bishu
before	5 × 4 = 20	12 × 4 = 48
	-12	-12
present	5	20
	+8	+8
after	10	17

5 = 20

1 = 4

Present age	Anil	Bishu
	32	60

Anil : Bishu = 8 :15

13. (b)

P	C	B
7	5	8
↓ + 50%	↓ + 40%	↓ + 25%
$\frac{21}{2}$	7	10

2 1 : 14 : 20

14. (b)

A	B	C	D	
4	5 →	5 →	5	D − B = 65 X 20.16
3 ←	3	4 →	4	= ₹1310.40
5 ←	5 ←	2	7	
60 :	75 :	100 :	14	⇒ 375 = ₹7560
				1 = 20.16

15. (b) (a + b) : (b + c): (c + a) = 7 : 4 : 5

2a + 2b + 20 = 16

a + b + c = 8

given that a + b + c = 16

8 = 16

⇒ 1 = 2

a + b = 14, b + c = 8, c + a = 10

a = 8, b = 6 C = 2

$(a^2 + b^2 + c^2) : (ab + bc + ca) = (64 + 36 + 4) : (48 + 12 + 16)$

= 104 : 76

= 26 : 19

16. (d) (a + b) : (b + c) : (c + a) = 15 : 14 : 11

2a + 2b + 2c = 40

a + b + c = 20

given a + b + c = 40

20 = 40

1 = 2

a + b = 30, b + c = 28, c + a = 22

a = 12, b = 18, c = 10

3a + b − 4c = 36 + 18 − 40 = 14

17. (c)

A	B	C	D
3	4 →	4 →	4
5 ←	5	6 →	6
8 ←	8 ←	8	9

120 · 160 · 192 · 216 ⇒ 688 = ₹12384

1 = 18

× 18

₹3456

18. (b)

III	I	II
	5	3
7	5	
7	5	3

⇒ 15 = ₹2130

1 = 142

× 142 × 412 × 412

₹994 ₹710 ₹426

19. (c.) 21 , 22 , 60 , 64

1 4

(21 - x)4 = (60 - x)1

3x = 24

x = 8

mean proportional = $\sqrt{(x+4)\left(\frac{x}{2}-1\right)}$

$= \sqrt{12 \times 3}$

= 6

20. (b)

P	Q	R	S	Total
3	4	5	6	⇒ 18

2 = ₹500

1 = 250

× 250

₹4500

21. (c)

A	B	C
7	12 →	12
8 ←	8	5
56	96	60 ⇒ 212

4 = ₹219

1 = 54.75

× 54.75

₹11607

22. (b)

	A	B
Ago	5	4
	-4	-4
Present 24_{ya} =	4 × 6	5
	+10	+10
after	34	30

1 = 4

× 4

20 years

Ratio = 34 : 30

= 17 : 15

23. (c)

I	II	III
7	11	
	11	15

7	11	15

⇒ 33 = 396

1 = 12

8

× 12

96

24. (d)

	A	B	C
	3	5	7
	× 5	× 5	× 5
Marbles	15	25	35

⇒ 15 = 75

1 = 5

New Marbles

A	B	C
15	25	35
+3	+5	
18	27	30

6 : 9 : 10

25. (a) 3 → I

4 → II

Average = $\frac{\frac{1}{3}+\frac{1}{4}}{2} = \frac{7}{72}$

$\frac{7}{24} = \frac{7}{21}$

$1 = \frac{1}{3}$

I = 9

II = 12

I + II = 9 + 12 = 21

Reciprocals I II

$\frac{1}{3}$ $\frac{1}{4}$

× $\frac{1}{3}$ × $\frac{1}{3}$

$\frac{1}{9}$ $\frac{1}{12}$

26. (a)

I	II	
7	9	⇒ = 16

× 8

128

Squares $7^2 + 9^2$ = 8320

130 = 8320

$1 = \sqrt{\frac{8320}{130}}$

1 = 8

27. (c)

A	B	C
5	2	4

⇒ 11 = 3780 - 130 - 150 - 200

11 = ₹3300

11 = 300

× 300

1200

+200

₹400

28. (c)

A	B
2	3 x 8 = 24

1 = 8

16 = 8x

+k +k

7 : 9

2

2k = 24 × 7 - 16 × 9

2k = 168 - 144

k = 12

29. (b)

A	B	C	D
1	3 →	3 →	3
2 ←	2	5 →	5
2 ←	2 ←	2	3
4	12	30	45 ⇒ 91 = 4095

1 = 45

33

× 45

₹1485

EXERCISE 10B

For SSC CHSL Exam

1. Two numbers X and Y are such that the sum of 18% of X and 8% of Y is one-third of the sum of 22% of X and 36% of Y. Find the ratio of X and Y.
SSC CHSL 02/06/2022(Shift-2)
(a) 2:5 (b) 3:11 (c) 3:8 (d) 8:3

2. If 1.5x = 0.04y, then what will be the value of $\frac{y-x}{y+x}$?
SSC CHSL 02/06/2022(Shift-1)
(a) $\frac{77}{73}$ (b) $\frac{77}{72}$ (c) $\frac{72}{77}$ (d) $\frac{73}{77}$

3. Three numbers A, B and C are in the ratio of 15: 21:27. The ratio of the difference between B and A to the difference between C and B is: **SSC CHSL 01/06/2022(Shift-3)**
(a) 1:1 (b) 42:43 (c) 41:42 (d) 10:11

4. The monthly income of two persons is in the ratio 4:5 and their expenditures are in the ratio 7:9. If each saves ₹250 per month, then their monthly incomes are:
SSC CHSL 01/06/2022(Shift-3)
(a) ₹400; ₹500 (b) ₹700; ₹900
(c) ₹900; ₹500 (d) ₹400; ₹700

5. Calculate the 3rd proportional to 14 and 28.
SSC CHSL 01/06/2022 (Shift-2)
(a) 65 (b) 16 (c) 24 (d) 56

6. A and B share a few marbles in the ratio 4: 5. If B gets 10 marbles more than A, then what is A's share?
SSC CHSL 01/06/2022 (Shift-1)
(a) 8 marbles (b) 42 marbles
(c) 12 marbles (d) 40 marbles

7. The ratio of the ages of two friends is 7:9, while after 10 years it will become 19: 23. What will be their average age 7 years from now? **SSC CHSL 01/06/2022 (Shift-1)**
(a) 33 years (b) 35 years (c) 36 years (d) 39 years

8. The mean proportional between 6 and another number is 30. What is that number?
SSC CHSL 31/05/2022 (Shift-3)
(a) 150 (b) $5\sqrt{6}$ (c) 180 (d) $6\sqrt{5}$

9. Find the mean proportional between 144 and 225.
SSC CHSL 31/05/2022 (Shift-2)
(a) $\frac{4}{5}$ (b) $\frac{27}{2}$ (c) 180 (d) $\frac{5}{4}$

10. A varies jointly with B and C. A = 6 when B = 3 and C = 2. Find A when B = 5 and C = 7.
SSC CHSL 10/06/2022 (Shift-3)
(a) 17.5 (b) 35 (c) 105 (d) 70

11. What is the mean proportional between 64 and 4096?
SSC CHSL 10/06/2022 (Shift-2)
(a) 512 (b) 192 (c) 128 (d) 8

12. Calculate the third proportional to 4, 15 and 24.
SSC CHSL 10/06/2022 (Shift-1)
(a) $\frac{32}{5}$ (b) $\frac{29}{5}$ (c) $\frac{21}{5}$ (d) $\frac{26}{5}$

13. Find the mean proportional between 0.04 and 0.0036.
SSC CHSL 09/06/2022 (Shift-3)
(a) 0.012 (b) 0.12 (c) 0.0012 (d) 0.004

14. What is the ratio between the fourth proportional of 3, 4, 9 and the mean proportional between 2 and 98?
SSC CHSL 11 July 2019 (Shift-2)
(a) 7:8 (b) 7:6 (c) 8:7 (d) 6:7

15. Rs. 8000 is distributed among A, B and C such that they receive notes of Rs. 500, Rs. 200 and Rs. 100 respectively. The amounts received by them are in the ratio 15:2:3. What was the ratio of the numbers of notes of Rs. 500, Rs 200 and Rs 100 ? **SSC CHSL 10 July 2019 (Shift-1)**
(a) 3:1:3 (b) 3:3:1 (c) 4:1:2 (d) 3:2:2

16. If a : b : c = 1:3:5, what is the value of $\frac{4a-b+2c}{3(a+b+c)}$?
SSC CHSL 8 July 2019 (Shift-3)
(a) $\frac{8}{27}$ (b) $\frac{10}{27}$ (c) $\frac{11}{27}$ (d) $\frac{1}{3}$

17. The ratio of incomes of A and B is 2 : 3 and that of their expenditure is 1 : 2. If 90% of B's expenditure is equal to the income of A, then what is the ratio of the saving of A and B? **SSC CHSL 2 July 2019 (Shift-1)**
(a) 1:1 (b) 9:8 (c) 8:7 (d) 3:2

18. Two numbers are in the ratio 3:4. On increasing each of them by 30, the ratio becomes 9:10. The numbers are:
SSC CHSL 8 July 2019 (Shift-2)
(a) 30,40 (b) 15,20 (c) 12,16 (d) 18,24

19. A sum of Rs. 4360 was to be divided among A, B, C and D in the ratio of 3:4: 5: 8, but it was divided in the ratio of $\frac{1}{3}:\frac{1}{4}:\frac{1}{5}:\frac{1}{8}$ by mistake. As a result:
SSC CHSL 1 July 2019 (Shift-3)
(a) A received Rs. 956 more
(b) B received Rs. 318 more
(c) D received Rs. 1144 less
(d) C received Rs. 132 less

20. In an examination, the success to failure ratio was 5:2. Had the number of failures been 14 more, then the success to failure ratio would have been 9:5. The total number of candidates who appeared for the examination was: **SSC CHSL 2 July 2019 (Shift-3)**
(a) 210 (b) 196 (c) 126 (d) 203

SOLUTIONS

1. (c) $x \times \frac{18}{100} + y \times \frac{18}{100} = \frac{1}{3}\left(x \times \frac{22}{100} + y \times \frac{36}{100}\right)$
$27x + 12y = 11x + 18y$
$16x = 6y$
$x : y = 3 : 8$

2. (d) $1.5x = 0.04y$
$\frac{x}{y} = \frac{2}{75}$
$\frac{y-x}{y+x} = \frac{75-2}{75+2} = \frac{73}{77}$

3. (a) A B C
15 21 27
6 6
Ratio = 6 : 6
= 1 : 1

4. (a)
	A	B	A	B
Income	4	5 ×2	8	10
Expend	7	9	7	9

1 = 50
A = 8 × 50 = ₹400
B = 10× 50 = ₹500

5. (d) 14, 28
III[rd] proportional = $\frac{28\times28}{14}$
= 56

6. (d) A B
4 5
× 10 1 = 10
40

7. (d)
Present 7 × 2 9 × 2 ⇒ 28 (×2) 36 (×2)
+ 10 + 10 14 + 10 18 + 10 5 = 10
After 19 23 19 23 1 = 2
Present age = 28, 36
Average age after 7 year = $\frac{28+36+14}{2} = \frac{78}{2}$
= 39 years

8. (a) a = 6 b = ? Mean proportional = 30
M.p = $\sqrt{ab}$
30 = $\sqrt{6b}$
b = $\frac{900}{6}$
b = 150

9. (c) Mean proportional = $\sqrt{144\times225}$
= 12 × 15
= 180

10. (b) A = 6 B = 3 C = 2
A joins with B and C
A = BC
6 = 3 × 2
1 = 1
When B = 5 C = 7
A = BC
A = 1 × 5 × 7
A = 35

11. (a) Mean proportional = $\sqrt{64\times4096}$
= 8 x 64
= 512

12. (a) 4, 15, 24
3[rd] proportional = 4:15:: a: 24
a = $\frac{24\times4}{15} = \frac{32}{5}$

13. (a) mean proportional = $\sqrt{0.004\times0.0036}$
= 0.2 × 0.06
= 0.012

14. (d) fourth proportional 3 : 4 : 9 : a
a = $\frac{4\times9}{3}$ = 12
Mean proportional = $\sqrt{2\times98}$ = 14
Ratio = 12 : 14
= 6 : 7

15. (a)
A	B	C	
15	2	3	⇒ 20 = ₹8000
× 400	× 400	× 400	1 = 400
6000	800	1200	
÷ 500	÷ 200	÷ 100	
12	4	12	

Ratio of Notes 12 4 12
3 : 1 : 3

16. (c) a : b : c = 1 : 3 : 5
$\frac{4a-b+2c}{3(a+b+c)} = \frac{4-3+10}{3(1+3+5)} = \frac{11}{27}$

17. (c)
	A	B	90% of B's expend = income of A
Income	2 × 9	3 × 9	
Expend	1 × 10	2 × 10	90% = $\frac{9}{10}$

	A	B	Ratio of saving = 8 : 7
In	18	27	
Ex	10	20	
Saving	8	7	

18. (b) 30 = 6 (3 → ×5 → 15 | 9) (4 → ×5 = 20 | 10) 6 = 30, 1 = 5
Numbers are 15 and 20

19. (c)
A	B	C	D	
3	4	5	8	⇒ 20 = ₹4360
× 218	× 218	× 218	× 218	1 = 218
654	872	1090	1744	

A : B : C : D
$\frac{1}{3}:\frac{1}{4}:\frac{1}{5}:\frac{1}{8}\Rightarrow$

A	B	C	D	
40	30	24	15	⇒ 109 = ₹4360
× 40	× 40	× 40	× 40	1 = 40
1600	1200	960	600	

D = 1744 − 600 = ₹1144
D received ₹1144 less

20. (c)
Success	failure	
5 × 9 = 45	2 × 9 = 18	7 = 14
9 × 5 = 45	5 × 5 = 25	1 = 2

Total no. of students = (45 + 18) × 2
= 126

EXERCISE 10C

For SSC CGL and CPO Exams

1. A certain sum is divided among A, B, C and D such that the ratio of the shares is A:B:C:D 4:12:30:45. If the difference between the shares of A and D is ₹5,535, then the total sum (in) is: **SSC CGL 24/8/2021 (Shift-3)**
(a) 12285 (b) 11000 (c) 12785 (d) 13550

2. Monthly salaries of Anil and Kumud are in the ratio 19:17, If Anil and Kumud get salary hike of Rs. 2000 and Rs. 1000 respectively, then the ratio in their salaries becomes 8: 7. What is the present salary of Kumud (in Rs)?
SSC CGL 24/8/2021 (Shift-2)
(a) 18000 (b) 38000 (c) 34000 (d) 35000

3. If p is the third proportional to 3, 9, then what is the fourth proportional to 6, p, 4?
SSC CGL 24/8/2021 (Shift-1)
(a) $\frac{3}{2}$ (b) $2\sqrt{3}$ (c) 10 (d) 18

4. When x is subtracted from each of the numbers 54, 49, 22 and 21, the numbers so obtained are in proportion. The ratio of (8x - 25) to (7x - 26) is:
SSC CGL 23/8/2021 (Shift-3)
(a) 29:24 (b) 15:13 (c) 27:26 (d) 5:4

5. If x is subtracted from each of 24, 40, 33 and 57, the numbers, so obtained are in proportion. The ratio of (5x + 12) to (4x + 15) is: **SSC CGL 23/8/2021 (Shift-2)**
(a) 4:3 (b) 14:13 (c) 7:4 (d) 7:5

6. Fourth proportion to 12, 18, 6 is equal to the third proportion to 4, k. What is the value of k?
SSC CGL 23/8/2021 (Shift-1)
(a) 6 (b) $4\sqrt{3}$ (c) 6.5 (d) 4

7. Two numbers are in the ratio 2:3.If 5 is subtracted from the first number and six is added to the second number, then the ratio becomes 5 : 12 What would the ratio become when eight is added to each number?
SSC CGL 20/8/2021 (Shift-3)
(a) 14:11 (b) 14:19 (c) 11:14 (d) 19:14

8. The ratio of monthly incomes of A and B is 4: 5 and that of their monthly expenditure is 3: 8. If the income of A is equal to the expenditure of B, then what is the ratio of savings of A and B? **SSC CGL 20/8/2021 (Shift-2)**
(a) 8:3 (b) 2:5 (c) 5:2 (d) 3:8

9. Alloy A contains metal x and y in the ratio 5:2 and alloy B contains these metals in the ratio 3:4. Alloy C is prepared by mixing A and B in the ratio 4 : 5. The percentage of y in alloy C is:
SSC CGL 18/08/2021 (Shift-3)
(a) $44\frac{4}{9}$ (b) $33\frac{4}{9}$ (c) $66\frac{4}{9}$ (4) $55\frac{5}{9}$

10. If a: b = 5:7, then (5a - 3b): (4a - 2b) is equal to:
SSC CGL 13 June 2019 (Shift-1)
(a) 2:3 (b) 5:4 (c) 4:3 (d) 3:2

11. If a:b = 2: 3, then (5a +3b) (6a - 2b) is equal to :
SSC CGL 12 June 2019 (Shift-2)
(a) 19: 6 (b) 3:2 (c) 17:5 (d) 10:7

12. If a:b = 2:3, then (5a - 2b): (5a + 2b) is equal to:
SSC CGL 12 June 2019 (Shift-1)
(a) 3:7 (b) 2:7 (c) 1:3 (d) 1:4

13. If a:b = 5: 8 and c: b = 4:3, then a:b:c is equal to:
SSC CGL 11 June 2019 (Shift-3)
(a) 15:24:28 (b) 5:6:8 (c) 15:24:32 (d) 5:8:6

14. If a:b = 2:3 and c: b = 5:6. then a:b:c is equal to:
SSC CGL 11 June 2019 (Shift-2)
(a) 4:6:5 (b) 6:9: 16 (c) 6:9: 12 (d) 10:15:18

15. If a:b = 5: 3, then (8a - 5b):(8a+ 5b) is equal to:
SSC CGL 11 June 2019 (Shift-1)
(a) 3:13 (b) 2:5 (c) 3:11 (d) 5:11

16. The ratio of present ages of A and B is 8: 15. Eight years ago, the ratio of their ages was 6: 13. What will be the ratio of ages of A and B after 8 years from now?
SSC CGL 7 June 2019 (Shift-1)
(a) 5:8 (b) 9:14 (c) 10: 17 (d) 5:9

17. The ratio of present ages of A and B is 8:9. After 9 years, the ratio will become 19: 21. C is 3 years younger to B. What is the present age (In years) of C?
SSC CGL 6 June 2019 (Shift-2)
(a) 49 (b) 48 (c) 51 (d) 52

18. When x is subtracted from each of 21, 22, 60 and 64, the numbers so obtained, in this order, are in proportion. What is the mean proportional between (x+1) and (7x+8). **SSC CGL 6 June 2019 (Shift-1)**
(a) 27 (b) 18 (c) 24 (d) 21

19. If x is added to each of 12, 28, 21 and 45, the numbers so obtained, in this order, are in proportion. What is the mean proportional between (x + 3) and (4x + 1)?
SSC CGL 4 June 2019 (Shift-3)
(a) 15 (b) 18 (c) 10 (d) 12

SOLUTIONS

1. (a) A B C D
4 12 30 45 ⇒ 91
41 = 5535₹
1 = 135
Total Sum = 91 × 135 = ₹12285

2. (c) Anil Kumud
3
Present $19_{\times 7} = 133$ $17_{\times 8} = 136$
+ 2000 x 7 + 1000 x 8
8 7
Difference
6000
3 = 6000
1 = 2000
Present salary of kumud = 17 × 2000
= ₹34000

3. (d) 3rd proportional = P = $\frac{9\times9}{3} = 27$
Fourth proportional to 6 : P : 4
$= \frac{27\times4}{3}$
= 18

4. (a) $\underset{5}{54}, \underset{}{49}, \underset{1}{22}, 21$

$(54 - x) \times 1 = (22 - x) \times 5$

$x = 14$

$$\frac{8x-25}{7x-26} = \frac{112-25}{98-26} = \frac{87}{72} = 29:24$$

5. (b) $\underset{16}{24}, \underset{2}{40}, \underset{24}{33}, \underset{3}{57}$

$(24 - x) \times 3 = (33 - x) \times 2$

$x = 6$

$$\frac{5x+12}{4x+15} = \frac{42}{39} = 14:13$$

6. (a) 3rd proportion to 4, k = 4th property 12,18,6

$$\frac{k \times k}{4} = \frac{18 \times 6}{12}$$

$k^2 = 36$

$K = 6$

7. (b)

$2_{\times 12} = 24$: $3_{\times 5} = 15$ (9)

$5_{\times 12} = 60$: $6_{\times 5} = 30$ (90)

$9 = 90$

$1 = 10$

No. are $\Rightarrow 2 \times 10 = 20$ (+8 → 28) , $3 \times 10 = 30$ (+8 → 38)

Ratio = 28 : 38

= 14 : 19

8. (c)

	A	B
Income	$4_{\times 2} = 8$	$5_{\times 2} = 10$
Expend	3	8
Saving	5 :	2

9. (a)

A		B	
X	Y	X	Y
$5_{\times 4}$	$2_{\times 4}$	$3_{\times 5}$	$4_{\times 5}$
7×4		7×5	

C ⇒ 4 : 5

C		
X	Y	Percentage of Y in C
A + B	A + B	$= \frac{4}{9} \times 100$
35 :	28	$= 44\frac{4}{9}\%$
5 :	4	

10. (a) a : b = 5 : 7

$$\frac{5a-3b}{4a-2b} = \frac{25-21}{20-14} = \frac{4}{6} = \frac{2}{3}$$

2 : 3

11. (a) a : b = 2 : 3

$$\frac{5a+3b}{6a-2b} = \frac{10+9}{12-6} = \frac{19}{6}$$

19 : 6

12. (d) a : b = 2 : 3

$$\frac{5a-2b}{5a+2b} = \frac{10-6}{10+6} = \frac{4}{16}$$

1 : 4

13. (c) a : b = 5 : 8 , c : b = 4 : 3

a	b	c
5	8 →	8
3 ←	3	4
15 :	24 :	32

14. (a)

a	b	c
2	3 →	3
6 ←	6	5
12	18	15

4 : 6 : 15

15. (d) a : b = 5 : 3

$$\frac{8a-5b}{8a+5b} = \frac{40-15}{40+15} = \frac{25}{35}$$

5 : 11

16. (c)

	A	B
ago	6	13
	-8 ↓ 2	-8 ↓ 2 = 8, 1 = 4
Present	$8_{\times 4} = 32$	$5_{\times 4} = 60$
after	+8 ↓ 40	+8 ↓ 68

Ratio = 40 : 68 ⇒ 10 : 17

17. (c)

	A		B	
Present	$8_{\times 2} \times 16$	:	$9_{\times 2} = 18$	+ 3 → 54 years
	+9 ↓ 3		+9 ↓	3 = 9, 1 = 3
After	19	:	21	

C is 3 years younger to B

Present Age of C = 54 - 3 = 51 years ·

18. (c) $\underset{1}{21}, \underset{}{22}, \underset{4}{60}, \underset{}{64}$

$(21 - x) \times 4 = (60 - x) \times 1$

$x = 8$

$x + 1 = 8 + 1 = 9$

$7x + 8 = 56 + 8 = 64$

mean proportion between 9, 64 = $\sqrt{9 \times 64}$

= 24

19. (a) $\underset{16}{12}, \underset{2}{28}, \underset{24}{21}, \underset{3}{45}$

$(12 + x) \times 3 = (21 + x) \times 2$

$x = 6$

$x + 3 = 6 + 3 = 9,$

$4x + 1 = 24 + 1 = 25$

mean proportion = $\sqrt{9 \times 25}$

= 15