

**MANIDHANAHEYAM FREE IAS ACADEMY – TNPSC GROUP – IV & VAO EXAM**  
**UNIT – X – APTITUDE & MENTAL ABILITY**  
**RATIO AND PROPORTION**

The competitive relation between two numbers or amount or quantities is called ratio.

The ratio between  $x$  and  $y$  can be written as  $x : y$  or  $\frac{x}{y}$

**RULES:**

1. If  $a : b :: c : d$ , then “a” and “d” are called extremes and “b” and “c” are called medians.

$\therefore$  Product of means = product of extremes.

$\therefore ad = bc$

**Directly proportional:**

If  $x$  is  $ky$ , where  $k$  is constant, then we say that  $x$  is directly proportional to  $y$ .

$x \propto y$

**Inversely proportional:**

If  $x = \frac{k}{y}$ , where  $k$  is constant, then  $x$  is indirectly proportional to  $y$ .

$$\therefore x \propto \frac{1}{y}$$

**Proportion:**

If two ratios are equal to each other, then they are said to be in proportion.

e.g:-  $a : b = c : d$

Then  $a, b, c, d$  are in proportion.

**Formulas :**

1.  $a : b = \frac{a}{b}$

2. If  $a : b = \frac{a}{b}$ , and is multiplied by  $c$ , then

$$\frac{a}{b} \times \frac{c}{c} = ac : bc$$

3. If  $a : b = c : d$  then,  $a : b :: c : d$ .

4. If  $\frac{a}{b}$  and  $\frac{c}{d}$  are proportional to each other then,  $\frac{a+x}{b+x}$  and  $\frac{c+x}{d+x}$  are proportional to each other.

5. Invertendo of  $a : b = c : d$  is  $b : a = d : c$ .

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**Problems:**

**Q1. Find the ratio of 5 days with 40 hours.**

- a) 1: 3
- b) 3:1
- c) 1:8
- d) 5: 4

**Ans: b**

One day = 24 hrs

5 days = 120 hrs

Ratio = 120: 40

=3:1

**Q2. Which of the following ratio is smallest**

- a) 5:7
- b) 2:3
- c) 3:4
- d) 3:5

**Ans: d**

5:7 = 0.714

2:3 = 0.666

3:4 = 0.74

3:5 = 0.6

**Q3. Two numbers are 20% and 40% higher than the third number respectively.**

**What is the ratio of both the numbers?**

- a) 12:14
- b) 14:13
- c) 14:12
- d) 1:2

**Ans: a**

Let 3<sup>rd</sup> number be 100

1<sup>st</sup> and 2<sup>nd</sup> number be 120 and 140

Required ratio = (120/140) = 12: 14

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**Q4. P: Q = 27: 36 and Q: R = 28: 27 then P: R =?**

- a) 9: 7
- b) 7: 9
- c) 9: 1
- d) 1: 1

**Ans: a**

$$\frac{P}{Q} \times \frac{Q}{R} = \frac{27}{36} \times \frac{28}{27} = \frac{7}{9}$$

$$\frac{P}{R} = \frac{7}{9}$$

**Q5. Divide 196 in the ratio 2:4:8. What will be the year share in rupees according to the above ratio?**

- a) 28, 56, 112
- b) 28, 58, 116
- c) 28, 57, 114
- d) 26, 52, 102

**Ans: a**

$$(196 \times 2) / 14 = 28$$

$$(196 \times 4) / 14 = 56$$

$$(196 \times 8) / 14 = 112$$

$$28: 56: 112$$

**Q6. The ratio of two number is 3: 4. Their sum is 70 how much should be added to each number so that their ratio becomes 5: 6?**

- a) 10
- b) 20
- c) 30
- d) 40

**Ans: b**

$$1^{\text{st}} \text{ no} = (3/7) \times 70 = 30$$

$$2^{\text{nd}} \text{ no} = (4/7) \times 70 = 40$$

$$\text{Adding } x \text{ in each number} = 5: 6$$

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$$\frac{30 + x}{40 + x} = \frac{5}{6}$$

$$180 + 6x = 200 + 5x$$

$$6x - 5x = 200 - 180$$

$$x = 20$$

**Q7. The ratio of two number is 2:4. Each number is increase by 10 the ratio becomes 4: 6. Find the biggest number?**

a) 10

b) 20

c) 5

d) 30

**Ans: b**

$$\frac{2x + 10}{4x + 10} = \frac{4}{6}$$

$$12x + 60 = 16x + 40$$

$$4x = 20$$

$$x = 5$$

$$2x: 4x = \text{biggest number}$$

$$2 \times 5: 4 \times 5$$

$$10: 20$$

**Q8. The ratio of two numbers are 4: 5. If five is subtracted from both the new ratio becomes 3: 4. Find the smallest number?**

a) 20

b) 30

c) 40

d) 25

**Ans: a**

$$\frac{4x - 5}{5x - 5} = \frac{3}{4}$$

$$16x - 20 = 15x - 15$$

$$x = 5$$

$$4x: 5x = \text{smallest number}$$

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= 20: 25

**Q9. The ratio of water and milk in a mixture is 5: 7. If the weight of the mixture is 360ml. What will be the weight of the milk present in it?**

- a) 150 ml
- b) 130 ml
- c) 260 ml
- d) 210 ml

**Ans: d**

Water: milk = 5: 7

Weight of mixture = 360 ml

$$= \frac{7}{(5+7)} \times 360$$

$$= 7 \times 30$$

$$= 210\text{ml}$$

**Q10. Certain number of girl and their cats or travelling by bus, the ratio of girl and cats is 5: 2. The bus has total 54 legs. find the total number of cats**

- a) 12
- b) 30
- c) 15
- d) 6

**Ans: d**

Girl and cats = 5x: 2x

$$(5x \times 2) + (2x \times 4) = 54$$

$$10x + 8x = 54$$

$$18x = 54$$

$$x = 3$$

$$\text{So the number of cats} = 2 \times 3 = 6$$

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**Q11. If the ratio of the length of all sides of triangle are in ratio 2: 3: 4 and its parameter 81cm then find the length of longest side.**

- a) 28
- b) 32 cm
- c) 36 cm
- d) 21 cm

**Ans: c**

$$2x + 3x + 4x = 81$$

$$9x = 81$$

$$x = 9$$

Longest side of triangle is  $4 \times 9 = 36\text{cm}$

**Q12. What is the fourth proportional number of 12, 24 and 26?**

- a) 51
- b) 52
- c) 56
- d) 12

**Ans: b**

$$12: 24:: 26: x$$

$$4^{\text{th}} \text{ number} = \frac{(24+26)}{12} = 52$$

**Q13. If 14, X and 56 are in consecutive ratio, find the X?**

- a) 21.
- b) 26.
- c) 28.
- d) 42.

**Ans: c**

$$14: x :: x: 56$$

$$x^2 = \sqrt{(14 \times 56)}$$

$$x^2 = \sqrt{7 \times 2 \times 2 \times 2 \times 2 \times 7}$$

$$x = 7 \times 2 \times 2$$

$$x = 28.$$

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Q14.  $0.16: x :: x: 0.64$ , then  $x$  is

- A.0.40.
- B.0.48.
- C.0.27
- D.0.32.

Ans: d

$$\frac{0.16}{x} = \frac{x}{0.64}$$

$$x^2 = 0.16 \times 0.64$$

$$x = 0.4 \times 0.8$$

$$x = 0.32$$

Q15. In  $\frac{26}{21} : \frac{24}{9} :: a : \frac{14}{3}$ , the value of  $a$  is,

- A. 2
- B. 1/3
- C. 1/2
- D. 3

Ans: c

$$\frac{\frac{26}{21}}{\frac{24}{9}} = \frac{a}{\frac{14}{3}}$$

$$\frac{26}{21} \times \frac{9}{24} = a \times \frac{3}{14}$$

$$a = \frac{26 \times 14 \times 9}{21 \times 24 \times 13}$$

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

Q16. The ratio of the number of green and yellow balls in the bag is constant. When there were 44 yellow balls, the number of green balls, was 36. If the number of green balls is 54 then what will be the number of yellow balls?

- A.66
- B.62
- C.68
- D.64

Ans: a

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$$(44/ 36) = (x/ 54)$$

$$x = (44 \times 54)/ 36$$

$$x = 66.$$

**Q17. 4<sup>th</sup> terms or in consecutive ratio first Second and fourth term or 4, 22 and 33 then, find the third term.**

a.8

b.6

c.11

d.3

**Ans: b**

$$4: 22 :: p: 33$$

$$4 \times 33 = 22 \times p$$

$$P = (4 \times 33) / 22$$

$$P = 6$$

**Q18. If the ratio of the angles of a triangle is 2: 3: 4, then find largest angle.**

a.60°

b.90°

c.30°

d.80°

**Ans: d**

$$2x + 3x + 4x = 180^\circ$$

$$9x = 180$$

$$x = 20^\circ$$

$$4x = 4 \times 20 = 80^\circ$$

**Q19. If the ratio of angles of a quadrilateral is 2: 4: 6: 8, then find the smallest angle.**

a.32°

b. 64°

c. 96°

d. 180°

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**Ans: a**

$$2x + 4x + 6x + 8x = 360^\circ$$

$$20x = 360^\circ$$

$$x = 18^\circ$$

$$\text{Smallest angle} = 2 \times 18 = 32^\circ$$

**Q20. If the three numbers are in the ratio of 2: 4: 6 and their sum is 360. Find the sum of the smallest and largest number?**

a. 220

b. 260

c. 240

d. 140

**Ans: c**

$$2x + 4x + 6x = 360$$

$$x = (360/12)$$

$$x = 30$$

$$2x + 6x = 60 + 360 = 240.$$

**Q21. On dividing of Rs.2800 between the  $\alpha$ ,  $\beta$ ,  $\Sigma$  by the ratio  $\frac{1}{3} : \frac{1}{6} : \frac{1}{12}$ . What amount will  $\alpha$  get?**

A. 800.

B. 400.

C. 1600.

D. 600

**Ans: c**

$$\alpha, \beta, \Sigma = \frac{1}{3} : \frac{1}{6} : \frac{1}{12} = \frac{8:4:2}{24} = 8: 4: 2$$

$$\text{Received amount by } \alpha = 2800 \times \frac{8}{14} = 1600$$

**Q22. If  $x: y = 2: 4$ , then  $(2x+y): (3x+2y) =$**

a. 4: 7

b. 7: 4

c. 14: 8

d. 4: 8

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**Ans: a**

$$(x/y) = (2/4)$$

$$(2x+y): (3x+2y) = (4 + 4): (6+8) = 8:14$$

$$(2x+y): (3x+2y) = 4: 7$$

**Q23. Two numbers are in ratio 4: 5 and their LCM is 180, then the larger number is**

- a. 9
- b. 45
- c. 15
- d. 36

**Ans: b**

$$4x \text{ \& } 5x = \text{LCM}$$

$$20x = 180$$

$$x = 9$$

$$\text{Larger number} = 5 \times x = 5 \times 9 = 45.$$

**Q24. The ratio of two numbers is 3: 4. The sum of their squares is 625. What is the sum of the numbers?**

- a. 5
- b. 35
- c. 25
- d. 15

**Ans: b**

According to question,

$$(3x)^2 + (4x)^2 = 625$$

$$25x^2 = 625$$

$$x^2 = 25$$

$$x = 5$$

$$3x + 4x = 7x = 7 \times 5 = 35.$$

**Q25. Three numbers are in ratio 1: 2: 3 and sum of their cubes is 4500, then the largest number is**

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- a. 5
- b. 25
- c. 15
- d. 20

**Ans: c**

$$x^3 + (2x)^3 + (3x)^3 = (4500/36) = 125$$

$$x = \sqrt[3]{125}$$

$$x = 5$$

The largest number is  $3 \times 5 = 15$ .

**Q26. If  $x: y = 14: 18$  and  $y: z = 30: 14$ , what is the value of  $x, z$  ?**

- a.3: 5
- b.5: 3
- c.4: 3
- d.4: 7

**Ans: b**

$$x: y = 14: 18$$

$$y: z = 30: 14$$

$$x: z = (x/y) \times (y/z) = (14/18) \times (30/14) = 30/18$$

$$x: z = 5: 3$$

**Q27.  $x = (1/3)Y$  and  $y = (1/2)Z$ , then what is  $X: Y: Z$ ?**

- a. 1:2:4
- b.1: 3: 9
- c.1: 3: 6
- d.2:4:9

**Ans: c**

$$x = (1/3)y$$

$$(x/y) = (1/3)$$

$$x:y = 1: 3$$

$$y = (1/2)z$$

$$(y/z) = (1/2)$$

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$$y: z = 1: 2 = 3: 6$$

$$x:z = (1/3) \times (3/6) = (1/6)$$

$$x: y: z = (1: 3: 3) \times (3: 3: 6)$$

$$x: y: z = 3: 9: 18$$

**Q28. If  $x: y = 2:1$ , then what is  $x^3 + y^3: x^3 - y^3$**

a. 9: 7

b. 4: 7

c. 7: 9

d. 3: 4

**Ans: a**

$$x: y = 2: 1$$

$$x = 2, y = 1.$$

$$x^3 + y^3 = (x+y) (x^2 - xy + y^2)$$

$$2^3 + 1^3 = (2+1) (2^2 - 2 + 1)$$

$$= 3 (4 - 2 + 1)$$

$$= 9$$

$$x^3 - y^3 = (x-y) (x^2 + xy + y^2)$$

$$= (2-1) (2^2 + 2 + 1)$$

$$= (1) (4 + 2 + 1)$$

$$= 7$$

$$x^3 + y^3: x^3 - y^3 = 9: 7$$

**Q29. Amount of Rs.12400 is shared among three workers in the ratio of  $\frac{1}{2} : \frac{1}{3} : \frac{1}{5}$**

**Find the value of least shared of three shares.**

a. 6000

b. 3000

c. 2400

d. 5400

**Ans: c**

$$\text{Total amount} = 12400$$

$$\text{Shares} = \frac{1}{2} : \frac{1}{3} : \frac{1}{5}$$

$$\text{LCM} = 30.$$

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$$\frac{1}{2}(30) : \frac{1}{3}(30) : \frac{1}{5}(30) = 15:10:6$$

Total shares = 31

$$1^{\text{st}} \text{ share} = (15/31) \times 12400 = 6000$$

$$2^{\text{nd}} \text{ share} = (10/31) \times 12400 = 4000$$

$$3^{\text{rd}} \text{ share} = (6/31) \times 12400 = 2400$$

Least share = 2400.

**Q30.** The ratio between present age of Aruna and Jagan is 5:7 respectively. After eight years Aruna's age will be 28 years. What was Jagan's age 6 years ago?

- a. 28
- b. 22
- c. 30
- d. 32

**Ans: b**

$$\text{Present age of Aruna} = 5x$$

$$\text{Present age of Jagan} = 7x$$

$$\text{Arun's age after 8 years} = 5x + 8$$

$$5x = 28 - 8 = 20$$

$$x = 4$$

$$\text{Jagan's present age} = 7x = 7 \times 4 = 28$$

$$\text{Jagan's age 6 years ago} = 28 - 6 = 22.$$

**Q31.** The ratio of boys and girls in school is 3: 2 when six more girls join, this ratio becomes 6: 5. What is the number of boys in the school?

- A. 42
- B. 36.
- C. 24
- D. 30.

**Ans: b**

Numb of boys and girls be  $3x$  and  $2x$ .

Six more girls joins then  $2x + 6$

The new ratio is 6: 5

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$$\frac{3x}{(2x + 6)} = \frac{6}{5}$$

$$15x = (2x + 6)6$$

$$15x = 12x + 36$$

$$x = 12$$

The number of boys =  $3x = 3 \times 12 = 36$ .

**Q32. A box contains the coins of one rupee, 50 paise and 25 paise in the ratio 5: 6: 8. If the total amount is 240 rupees, what is the number of one rupee coin?**

A. 100

B.120

C.140

D.160

Ans: b

Let the number of one rupee, 50 paise and 25 paise coins be  $5x, 6x, 8x$ .

$$5x + \frac{6x}{2} + \frac{8x}{4} = 240$$

$$5x + 3x + 2x = 240$$

$$10x = 240$$

$$x = 24.$$

Hence the number of one rupee coins is  $5x = 5 \times 24 = 120$

**Q33. There are Milk in two cans. In first can, the ratio of water and milk is 8: 3 and in second can the ratio of water and milk is 15: 7 respectively. Then what is the ratio in which the two can of milk to be mixed to get milk in ratio of 5:2?**

A.7: 4.

B.2: 5.

C.3: 2.

D.5: 2

Ans: d

**Total litres**

$x$

**water**

$(8/11)x$

**milk**

$(3/11)x$

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$$y \qquad (15/22)x \qquad (7/22)y$$

Total milk and water  $(8/11)x + (15/22)y$ ;  $(3/11)x + (7/22)y$ .

New ratio = 5: 2

$$\frac{\frac{8}{11}x + \frac{15}{22}y}{\frac{3}{11}x + \frac{7}{22}y} = \frac{5}{2}$$

$$\frac{16x + 15y}{22} = \frac{5}{2}$$

$$\frac{16x + 15y}{6x + 7y} = \frac{5}{2}$$

$$32x + 30y = -30x + 35y$$

$$32x - 30x = 35y - 30y$$

$$2x = 5y$$

$$\frac{x}{y} = \frac{5}{2} \gg x:y = 5:2$$

**Q34. If the ratio of the sides of two equilateral triangle is 1: 2 what is the ratio of their area?**

A.49.

B.14.

C. 12.

D.23.

**Ans: b**

$$\text{Area of triangle} = \frac{\sqrt{3}}{4} a_1^2 : \frac{\sqrt{3}}{4} a_2^2$$

$$a_1^2 : a_2^2 = 1^2 : 2^2 = 1: 4$$

**Q35. A and B have income in the ratio 5: 3. The expense of a B and C are in ratio of 8: 5: 2 if C spends Rs.2000 and B saves Rs.700. What is A's saving?**

A. 1500

B. 1000

C. 2500

D. 500

**Ans: a**

Income of A and B = 5k and 3k

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Expense of A,B,C are  $8e, 5e$  and  $2e$ .

If C spends 2000, then C's expense is 2000

$$2e = 2000$$

$$e = 1000$$

$$5k - B's \text{ savings} = 700$$

$$B's \text{ salary} - B's \text{ expense} = 700$$

$$3k - 5e = 700$$

$$3k - 5000 = 700$$

$$3k = 5700$$

$$K = 1900$$

$$A's \text{ saving} = A's \text{ salary} - A's \text{ expense}$$

$$= 5k - 8e$$

$$= 5(1900) - 8(1000)$$

$$= 9500 - 8000$$

$$= 1500$$

**Q36. There are three numbers A,B,C, such that twice A is equal to thrice B and four times B is equal to 5 times C. What is the ratio between A and C?**

a. 3: 4

b. 8:15

c. 15:8

d. 4:3

**Ans: c**

$$2A = 3B$$

$$(A/B) = (3/2)$$

$$A: B = 3:2$$

$$4B = 5C$$

$$(B/C) = (5/4)$$

$$B: C = 5:4$$

$$A: B: C = 15: 10: 8$$

$$A: C = 15: 8$$

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**Q37. Marks of two candidates. P and Q are in the ratio 2:5. If the P's score is 120 what is Q score?**

- A. 120
- B. 240
- C. 300
- D. 360

**Ans: c**

Let the marks be  $2x, 5x$

$$2x = 120$$

$$x = 60$$

$$\text{Then, } 5x = 5(60) = 300$$

**Q38. The salary of three men PQR is in the following ratio P:Q = 5:3 , Q:R = 4:5 .And their total salary amount to 564000 then find salary of B.**

- A. 124000
- B. 104000
- C. 114000
- D. 144000

**Ans: d**

$$P:Q = 5:3$$

$$Q:R = 4:5$$

$$\text{Then, } P: Q: R = 20: 12: 15$$

$$Px + Qx + Rx = 20x + 12x + 15x = 47x$$

$$47x = 564000$$

$$x = 12000$$

$$\text{B's salary} = 12x = 12 \times 12000 = 144000$$

**Q39. Sum of two numbers is twice their difference. Find the ratio of two numbers?**

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- a.1:2
- b.2:1
- c.3:1
- d.1:3

**Ans: c**

Let the numbers be  $x, y$

Their sum be  $x + y$  and difference be  $x - y$

$$x + y = 2(x - y)$$

$$x + y = 2x - 2y$$

$$y + 2y = 2x - x$$

$$3y = x$$

$$(x / y) = (3/1)$$

$$x : y = 3:1$$

**Q40. There are two numbers in the ratio 6: 5. If 50% of the first number is 420, What is the 25% of the second number?**

- A. 50
- B. 100
- C. 175
- D. 200

**Ans: c**

Let the number be  $6x, 5x$

50% of first number = 420

$$(50/100) (6x) = 420$$

$$3x = 420$$

$$x = 140$$

$$25\% \text{ of } 2^{\text{nd}} \text{ number} = (1/4) \times 5 \times 140 = 175$$

**Q41. Two numbers are in the ratio 2: 3. If two is subtracted from the first and 2 is added to the second, the ratio becomes 1: 2, what is the sum of the numbers?**

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A.30.

B.28.

C.24.

D.10.

**Ans: a**

Let the number be  $2x$  and  $3x$

$$(2x-2)/(3x+2) = (1/2)$$

$$(4x-4) = (3x+2)$$

$$4x-3x = 6$$

$$x = 6$$

$$\text{The sum of two numbers} = 12 + 18 = 30$$

**Q42. Of three numbers. The ratio of first and second is 8:9. The ratio of second and third is 3:4. The product of first and third is 4800. what is the sum of the three numbers?**

A.  $100\sqrt{2}$

B.  $120\sqrt{2}$

C.  $140\sqrt{2}$

D.  $145\sqrt{2}$

**Ans: d**

Let the number be A, B, C

$$A : B = 8 : 9 : 9$$

$$B : C = 3 : 3 : 4$$

$$A : B : C = 24 : 27 : 36 = 8 : 9 : 12$$

$$\text{Product of 1}^{\text{st}} \text{ and 3}^{\text{rd}} \text{ number} = (8x) \times (12x)$$

$$96x^2 = 4800$$

$$x^2 = (4800/96)$$

$$x^2 = 50$$

$$x = 5\sqrt{2}$$

$$\text{Sum of three numbers} = 8x + 9x + 12x$$

$$= 40\sqrt{2} + 45\sqrt{2} + 60\sqrt{2}$$

$$= 145\sqrt{2}$$

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**Q43. The sum of two numbers is 20 and their difference is 25. What is the ratio of two numbers?**

- a. 9:1
- b. 7:9
- c. 3:5
- d. 2:7

**Ans: a**

Let the two numbers be  $x$  and  $y$

$$x + y = 20$$

$$x - y = 25$$

$$2x = 45$$

$$x = 22.5$$

$$x - y = 25$$

$$Y = 22.5 - 25$$

$$Y = 2.5$$

$$x:y = 22.5: 2.5$$

$$(x/y) = (22.5/2.5) = (9/1) = 9: 1$$

**Q44. Three numbers are in ratio  $(1/2):(2/3):(3/4)$ . The difference between the greatest number and smallest is 36. What are the numbers?**

- a. 72,84,108
- b. 60,72,96
- c. 72,84,96
- d. 72,96,108

**Ans: d**

The ratio  $(1/2): (2/3): (3/4)$

$$\text{LCM} = 12$$

$$(1/2) \times 12 : (2/3) \times 12 : (3/4) \times 12 = 6:8:9$$

Let the numbers be  $6x, 8x, 9x$ .

$$\text{Difference } 9x - 6x = 36$$

$$x = 12$$

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Hence the numbers are 72, 96, 108.

**Q45. Three numbers are in ratio 5: 6: 7. If the product of the number is 5670, what is the greatest number?**

- a.15
- b.18
- c.21
- d.28

**Ans: c**

Let the numbers be  $5x, 6x, 7x$

$$(5x) \times (6x) \times (7x) = 5670$$

$$x^3 = (5670 / 5 \times 6 \times 7)$$

$$x^3 = 27$$

$$x = 3$$

Hence the numbers are 15, 18, 21.

**Q46. A sum of Rs.300 is divided among A,B and C in such a way that B gets Rs.30 more than A, C gets Rs.60 more than B. What is the ratio of their share?**

- a. 5:3:2
- b. 2:3:5
- c. 3:2:5
- d. 2:5:3

**Ans: b**

$$A+B+C = 300$$

Let A gets Rs.A

$$\text{Then B gets} = A + 30$$

$$\text{C gets } B + 60 = A + 90$$

$$A+A+30+A+90 = 300$$

$$3A + 120 = 300$$

$$3A = 180$$

$$A = 60$$

$$\text{Share of A:B:C} = 60: 90: 150 = 2: 3: 5$$

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**Q47. Four numbers are in ratio 1:2:3:4. The sum of four numbers is 160. What is the sum of 2<sup>nd</sup> and 3<sup>rd</sup> number?**

- a.80
- b.60
- c.100
- d.50

**Ans: a**

Let the number be  $x, 2x, 3x, 4x$ .

$$x+2x+3x+4x = 160$$

$$10x = 160$$

$$x = 16$$

$$\text{Sum of 2<sup>nd</sup> and 3<sup>rd</sup> number} = 2(16) + 3(16) = 80$$

**Q48. The product of two positive integer is 75. And their ratio is 9:7. Find the smallest of the two integers.**

- a.35
- b.45
- c.25
- d.55

**Ans: a**

Let the two numbers be  $9x, 7x$

$$\text{Product } (9x) \times (7x) = 63x^2 = 1575$$

$$x^2 = 25$$

$$x = 5$$

$$\text{Smallest number is } 7x = 7(5) = 35$$

**Q49. The number of students in three camps are in the ratio 2:3:4. If 12 students are increased in each camp, the ratio changes to 8:11:14. What is the total number of students in all the three camps?**

- a.162
- b.108

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c. 96

d. 54

**Ans: a**

Let the number of students in each camp be  $2x$ ,  $3x$ ,  $4x$ .

$$(2x + 12) / (3x + 12) = (8/11)$$

$$22x + 132 = 24x + 96$$

$$2x = 132 - 96$$

$$x = 18$$

$$\text{Total number of students} = 36 + 54 + 72 = 162.$$

**Q50. Rs. 1980 is divided among three persons. Half of 1st person share,  $(1/3)$  of second's share and  $(1/6)$  of third's share are equal. Find the value of largest share.**

a. 1000

b. 1080

c. 980

d. 900

**Ans: b**

Let the share be A, B, C.

$$\text{Given } (A/2) = (B/3) = (C/6)$$

$$(A/B) = (2/3) \text{ and } (A/C) = (2/6) = (1/3) \text{ and } (B/C) = (3/6) = (1/2)$$

$$A : B = 2 : 3 : 3$$

$$B : C = 1 : 1 : 2$$

$$A : B : C = 2 : 3 : 6$$

$$2x + 3x + 6x = 1980$$

$$11x = 1980$$

$$x = 180$$

$$\text{Largest share} = 180 \times 6 = 1080$$

**PREVIOUS YEAR QUESTIONS:**

**1. If  $a : b = 2 : 3$ ,  $b : c = 6 : 5$  and  $a + b + c = 30$ , then  $2a + 3b + 4c$  is**

a. 30

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**b.92**

c.100

d.90

**Ans: b**

**2. Which one of the following is the smallest ratio? 7:13, 17:25, 7:15, 15:23**

a. 7:13

b. 17:25

**c. 7:15**

d. 15:23

**Ans: c**

**3. Two numbers are in the ratio 3 : 5. If 9 be subtracted from each , then they are in the ratio 12:23 . Find the second number**

a.52

b. 53

c. 54

**d. 55**

**Ans: d**

**4. What is the third proportional to 0.34 and 0.50?**

**a. 0.74**

b. 0.75

c. 0.76

d. 0.78

**Ans: a**

**5. If a: b - 4: 1, then the value of  $\sqrt{ab} + \sqrt{(b/a)}$  is**

**a.(5/2)**

b.4

c.8

d.(3/2)

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Ans: a

6. What is the ratio of  $2\frac{1}{2}$  hrs to 20 minutes?

- a. 15:3
- b. 15:1
- c. 10:2
- d. 15:2**

Ans: d

7. Which of the ratios is greatest?

- a. 7:15
- b. 15:23
- c. 17:25
- d. 21:29**

Ans: d

8. Golden ratio 1:1.6 forms a proportion with  $x$ : 8, then value of  $x$  is

- a. 5**
- b. 3
- c. 2
- d. 1

Ans: a

9. If  $2x + 3y - 5z = 0$  and  $-3x + 2y + 7z = 0$  then the ratio  $x : y : z$  is equal to

- a. 31:1:13**
- b. 1:13:31
- c. 2:3:5
- d. 13:7:5

Ans: a

10. If  $a : b$  is  $2 : 3$ ,  $b : c$  is  $4 : 3$  and  $c : d$  is  $2 : 5$  then  $a : d$  is

- a. 18:45
- b. 16:45**
- c. 8:45

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d.16:18

**Ans: b**

11. Find the value of  $x$  if  $(6x + 15) : (2x + 3) = 10 : 3$

a.3

b.4

c.-1

d.-4

**Ans: a**

12. The inverse ratio of 1:2:3 is

a.3:2:1

**b.6:3:2**

c.3:6:2

d.3:1:2

**Ans: b**

13. If  $a:b::c:d$  is a proportion then, which one of the following is true?

a.  $a:b::d:c$

b.  $(a+b):b :: (c+d):c$

**c.  $(a-b):b :: (c-d):c$**

d.  $b:a :: c:d$

**Ans: c**

14. 2:3, 3:5, 4:7, 5:8 Which is the biggest ratio?

a.3:5

b.4:7

c.5:8

**d.2:3**

**Ans: d**

15. Two whole numbers whose sum is 72 cannot be in the ratio?

a.5:7

b.3:5

**c.3:4**

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d.4:5

**Ans: c**

16. If  $a : b = 2 : 3$ ,  $b : c = 5 : 7$  and  $c$  is 42 what is  $a = ?$

a.12

**b.20**

c.21

d.22

**Ans: b**

17. Find the number that must be subtracted from each term of the ratio 27 : 43 to make it 7:15

a.17

b.20

c.27

**d.13**

**Ans: d**

18. If  $\frac{A}{3} = \frac{B}{4} = \frac{C}{5}$  then,  $A:B:C = ?$

a.4:3:5

b.5:4:3

**c.3:4:5**

d.20:15:2

**Ans: c**

19. If  $\frac{A}{10} = \frac{B}{15} = \frac{C}{20}$  then,  $A:B:C = ?$

a.1:2:3

**b.2:3:4**

c.3:4:5

d.4:5:6

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Ans: b

20.  $\frac{1}{x} : \frac{1}{y} : \frac{1}{z} = 2 : 3 : 5$ , then  $x:y:z = ?$

a. 2:3:5

b. 6:10:15

c. 5:3:2

d. 15:10:6

Ans: d

