Ratio and Proportion

1. A and B together have Rs. 1210. $\frac{4}{15}$ If of A's amount is $\frac{2}{5}$ equal to of B's amount, how much amount does B have?

A. Rs. 460

B. Rs. 484

C. Rs. 550

D. Rs. 664

Answer: Option **B**

Explanation:

$\frac{4}{15}A = \frac{2}{5}B$

$\Rightarrow A = \left(\frac{2}{5} \times \frac{15}{4}\right)B$

$\Rightarrow A = \frac{3}{2}B$

$\Rightarrow \frac{A}{B} = \frac{3}{2}$

$\Rightarrow A : B = 3 : 2.$

$\therefore$ B's share = Rs. $\left(1210 \times \frac{2}{5}\right)$ = Rs. 484.

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2. Two numbers are respectively 20% and 50% more than a third number. The ratio of the two numbers is:

A. 2 : 5

B. 3 : 5

C. 4 : 5

D. 6 : 7

Answer: Option **C**

Explanation:
Let the third number be x.

Then, first number = 120% of x = $\frac{120x}{100} = \frac{6x}{5}$

Second number = 150% of x = $\frac{150x}{100} = \frac{3x}{2}$

$\therefore$ Ratio of first two numbers = $\left(\frac{6x}{5} : \frac{3x}{2}\right)$ = $12x : 15x = 4 : 5$.

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3. A sum of money is to be distributed among A, B, C, D in the proportion of 5 : 2 : 4 : 3. If C gets Rs. 1000 more than D, what is B's share?

A. Rs. 500

B. Rs. 1500

C. Rs. 2000

D. None of these

Answer: Option **C**

Explanation:
Let the shares of A, B, C and D be Rs. $5x$, Rs. $2x$, Rs. $4x$ and Rs. $3x$ respectively.
Then, $4x - 3x = 1000$
$\Rightarrow x = 1000$.

$\therefore$ B's share = Rs. $2x$ = Rs. (2 x 1000) = Rs. 2000.

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4. Seats for Mathematics, Physics and Biology in a school are in the ratio 5 : 7 : 8. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the ratio of increased seats?

A. 2 : 3 : 4

B. 6 : 7 : 8

C. 6 : 8 : 9

D. None of these

Answer: Option **A**

Explanation:
Originally, let the number of seats for Mathematics, Physics and Biology be $5x$, $7x$ and $8x$ respectively.
Number of increased seats are (140% of $5x$), (150% of $7x$) and (175% of $8x$).

$\Rightarrow \left(\frac{140}{100} \times 5x\right)$, $\left(\frac{150}{100} \times 7x\right)$ and $\left(\frac{175}{100} \times 8x\right)$

$\Rightarrow 7x, \frac{21x}{2}$ and $14x$.

$\therefore$ The required ratio = $7x : \frac{21x}{2} : 14x$

$\Rightarrow 14x : 21x : 28x$

$\Rightarrow 2 : 3 : 4$.

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5. In a mixture 60 litres, the ratio of milk and water 2 : 1. If this ratio is to be 1 : 2, then the quantity of water to be further added is:

   A. 20 litres

   B. 30 litres

   C. 40 litres

   D. 60 litres

   Answer: Option **D**

   Explanation:

   Quantity of milk = $\left(60 \times \frac{2}{3}\right)$ litres = 40 litres.

   Quantity of water in it = (60- 40) litres = 20 litres.

   New ratio = 1 : 2

   Let quantity of water to be added further be x litres.
   Then, milk : water = $\frac{40}{(20 + x)}$.

   Now, $\left(\frac{40}{20 + x}\right) = \frac{1}{2}$

   $\Rightarrow 20 + x = 80$
   $\Rightarrow x = 60$.

   $\therefore$ Quantity of water to be added = 60 litres.

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6. The ratio of the number of boys and girls in a college is 7 : 8. If the percentage increase in the number of boys and girls be 20% and 10% respectively, what will be the new ratio?

   A. 8 : 9

   B. 17 : 18

C. 21 : 22

D. Cannot be determined

Answer: Option **C**

Explanation:

Originally, let the number of boys and girls in the college be $7x$ and $8x$ respectively. Their increased number is (120% of $7x$) and (110% of $8x$).

$\Rightarrow \left(\frac{120}{100} \times 7x\right)$ and $\left(\frac{110}{100} \times 8x\right)$

$\Rightarrow \frac{42x}{5}$ and $\frac{44x}{5}$

$\therefore$ The required ratio = $\left(\frac{42x}{5} : \frac{44x}{5}\right)$ = 21 : 22.

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7. Salaries of Ravi and Sumit are in the ratio 2 : 3. If the salary of each is increased by Rs. 4000, the new ratio becomes 40 : 57. What is Sumit's salary?

A. Rs. 17,000

B. Rs. 20,000

C. Rs. 25,500

D. Rs. 38,000

Answer: Option **D**

Explanation:

Let the original salaries of Ravi and Sumit be Rs. $2x$ and Rs. $3x$ respectively.

Then, $\frac{2x + 4000}{3x + 4000} = \frac{40}{57}$

$\Rightarrow 57(2x + 4000) = 40(3x + 4000)$

$\Rightarrow 6x = 68,000$

$\Rightarrow 3x = 34,000$

Sumit's present salary = $(3x + 4000)$ = Rs.(34000 + 4000) = Rs. 38,000.

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8. If 0.75 : x :: 5 : 8, then x is equal to:

A. 1.12

B. 1.2

C. 1.25

D. 1.30

Answer: Option **B**
Explanation:

$(x \times 5) = (0.75 \times 8) \Rightarrow x = \left(\frac{6}{5}\right) = 1.20$

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9. The sum of three numbers is 98. If the ratio of the first to second is 2 :3 and that of the second to the third is 5 : 8, then the second number is:

   A. 20

   B. 30

   C. 48

   D. 58

   Answer: Option **B**
   Explanation:

   Let the three parts be A, B, C. Then,

   $A : B = 2 : 3$ and $B : C = 5 : 8 = \left(5 \times \frac{3}{5}\right) : \left(8 \times \frac{3}{5}\right) = 3 : \frac{24}{5}$

   $\Rightarrow A : B : C = 2 : 3 : \frac{24}{5} = 10 : 15 : 24$

   $\Rightarrow B = \left(98 \times \frac{15}{49}\right) = 30.$

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10. If Rs. 782 be divided into three parts, proportional to $\frac{1}{2} : \frac{2}{3} : \frac{3}{4}$, then the first part is:

    A. Rs. 182

    B. Rs. 190

    C. Rs. 196

    D. Rs. 204

    Answer: Option **D**
    Explanation:

    Given ratio = $\frac{1}{2} : \frac{2}{3} : \frac{3}{4} = 6 : 8 : 9.$

    $\therefore$ 1st part = Rs. $\left(782 \times \frac{6}{23}\right)$ = Rs. 204

11. The salaries A, B, C are in the ratio 2 : 3 : 5. If the increments of 15%, 10% and 20% are allowed respectively in their salaries, then what will be new ratio of their salaries?

A. 3 : 3 : 10

B. 10 : 11 : 20

C. 23 : 33 : 60

D. Cannot be determined

Answer: Option **C**

Explanation:

Let A = 2k, B = 3k and C = 5k.

A's new salary = $\frac{115}{100}$ of 2k = $\left(\frac{115}{100} \times 2k\right)$ = $\frac{23k}{10}$

B's new salary = $\frac{110}{100}$ of 3k = $\left(\frac{110}{100} \times 3k\right)$ = $\frac{33k}{10}$

C's new salary = $\frac{120}{100}$ of 5k = $\left(\frac{120}{100} \times 5k\right)$ = 6k

$\therefore$ New ratio $\left(\frac{23k}{10} : \frac{33k}{10} : 6k\right)$ = 23 : 33 : 60

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12. If 40% of a number is equal to two-third of another number, what is the ratio of first number to the second number?

A. 2 : 5

B. 3 : 7

C. 5 : 3

D. 7 : 3

Answer: Option **C**

Explanation:

Let 40% of A = $\frac{2}{3}$ B

Then, $\frac{40A}{100} = \frac{2B}{3}$

$\Rightarrow \frac{2A}{5} = \frac{2B}{3}$

$\Rightarrow \frac{A}{B} = \left(\frac{2}{3} \times \frac{5}{2}\right) = \frac{5}{3}$

$\therefore$ A : B = 5 : 3.

13. The fourth proportional to 5, 8, 15 is:

A. 18

B. 24

C. 19

D. 20

Answer: Option **B** **Explanation:**
Let the fourth proportional to 5, 8, 15 be *x*. Then,
5 : 8 : 15 : *x*
$\Rightarrow 5x = (8 \times 15)$
$x = \frac{(8 \times 15)}{5} = 24.$
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14. Two number are in the ratio 3 : 5. If 9 is subtracted from each, the new numbers are in the ratio 12 : 23. The smaller number is:

A. 27

B. 33

C. 49

D. 55

Answer: Option **B**
Explanation:
Let the numbers be 3*x* and 5*x*.
Then, $\frac{3x - 9}{5x - 9} = \frac{12}{23}$
$\Rightarrow 23(3x - 9) = 12(5x - 9)$
$\Rightarrow 9x = 99$
$\Rightarrow x = 11.$

$\therefore$ The smaller number = (3 x 11) = 33.

15. In a bag, there are coins of 25 p, 10 p and 5 p in the ratio of 1 : 2 : 3. If there is Rs. 30 in all, how many 5 p coins are there?

A. 50

B. 100

C. 150

D. 200

Answer: Option **C**

Explanation:

Let the number of 25 p, 10 p and 5 p coins be x, $2x$, $3x$ respectively.

Then, sum of their values = Rs. $\left(\frac{25x}{100} + \frac{10 \times 2x}{100} + \frac{5 \times 3x}{100}\right)$ = Rs. $\frac{60x}{100}$

$\therefore \quad \frac{60x}{100} = 30 \quad \Leftrightarrow \quad x = \frac{30 \times 100}{60} = 50.$

Hence, the number of 5 p coins = (3 x 50) = 150.