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Ratio

Definition of Ratio:

The comparison or simplified form of two quantities of the same kind is referred to as ratio.

Ratio formula:

$$a:b \rightarrow a/b.$$

Step by step Procedure for Solving Ratio Problems:

1. Find total parts by adding all ratios ($A+B+C$).
2. Draw diagram & make total parts according to given ratio.
3. Share in one part = $\frac{\text{Total}}{\text{sum of ratio}}$
4. Re-Use given ratio to find desired share.

CSS-2017, Q.8 Part-A

Given Data:

- Divide Rs. 500 b/w Asham, Mariam, & Sarim.
- Asham gets $\frac{2}{3}$ of what Mariam gets & Mariam get $\frac{1}{4}$ of what Sarim gets.

Required:

Find the share of each?

Babar Paper Product

Formula:

Ratio

Solution:

According to Given Condition:
let the share of Asham is "A", Mariam
"M", & Sarim "S" respectively.

$$\text{Asham} + \text{Mariam} + \text{Sarim} = 500$$

$$\frac{2}{3}(\text{Mariam}) + \frac{1}{4}(\text{Sarim}) + S = 500$$

Now:

$$\frac{2}{3}M + \frac{1}{4}S + S = 500 \rightarrow \textcircled{a}$$

put $M = \frac{1}{4}S$ in eq "a".

$$\text{eq } \textcircled{a} \Rightarrow \frac{2}{3}\left(\frac{1}{4}S\right) + \frac{1}{4}S + S = 500 \rightarrow \textcircled{b}$$

Taking L.C.M of eq \textcircled{b} .

$$\text{eq } \textcircled{b} \Rightarrow \frac{2S}{12} + \frac{S}{4} + S = 500$$

$$\Rightarrow \frac{2S + 3(S) + 12(S)}{12} = 500$$

$$2S + 3S + 12S = 500 \times 12$$

$$\Rightarrow 2S + 3S + 12S = 6000$$

$$\text{It means } 17S = 6000$$

$$S = \frac{6000}{17}$$

$$S = 352.9 \Rightarrow 353$$

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Sarim gets Rs. 353 of Rs. 500.

Now:

• $Mariam = \frac{1}{4} (\text{Sarim})$

$$M = \frac{1}{4} (353)$$

$$M = \frac{353}{4}$$

$$\boxed{Mariam = \text{Rs. } 88}$$

$$\begin{array}{r} 88 \\ 4 \overline{) 353} \\ \underline{32} \\ 33 \\ \underline{32} \\ 1 \end{array}$$

∴

$$\text{Asham} = \frac{2}{3} (\text{Mariam})$$

Putting values

$$A = \frac{2}{3} (88)$$

$$\boxed{\text{Asham} = \text{Rs. } 58.6 \text{ or } 59}$$

$$\begin{array}{r} 88 \\ 2 \overline{) 176} \\ \underline{176} \\ 0 \end{array}$$
$$\begin{array}{r} 176 \\ 3 \overline{) 176} \\ \underline{15} \\ 26 \\ \underline{24} \\ 20 \\ \underline{18} \\ 2 \end{array}$$

Answer:

Sarim gets Rs. 353,

Mariam gets Rs. 88, ∴

Asham gets Rs. 59 respectively.

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Q: CBS-2018, Q-6, Part-C

Given Data:

Tahir total investment = Rs. 15000/-

Umar total investment = Rs. 30000/-

Usman total investment = Rs. 45000/-

Profit earned at the end of the
Year = Rs. 406,000.

Required:

Find the share of each one?

Formula:

Ratio (T: Um: Us)

Solution:

According to Given Data, the Capital was kept for 12 months.

So,

Tahir's total investment in 1-year = 15000×12
= 180,000 Rs.

Umar's total investment in 1 year = 30000×7
= 210,000 Rs.

Usman's total investment in 1-year = 45000×4
= 180,000 Rs.

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So, the profit earned at the end will be shared in the ratio:

$$180,000 : 210,000 : 180,000$$

The simplified form of capital ratio share will be:

$$18 : 21 : 18$$

$$6 : 7 : 6$$

$$\text{Total share} = 6 + 7 + 6 \Rightarrow 19$$

According to question:

$$\text{profit earned in a year} = 406,000$$

So, by formula:

$$\text{Share of a person} = \frac{\text{profit earned}}{\text{total share}} \times \text{share of that person}$$

Tahir:

$$\begin{aligned} \text{Share of Tahir} &= \frac{406,000}{19} \times 6 \\ &= 21,368.42 \times 6 \end{aligned}$$

$$\boxed{\text{Tahir's share} = 1,28,210}$$

Umar:

$$\text{Share of one part} = 21,368.42$$

Umar has 7 part so,

$$21,368.42 \times 7 = \text{Rs. } 149,579$$

$$\boxed{\text{Umar's share} = \text{Rs. } 149,579}$$

Usman:

$$6 \times 21,368.42 = 128,210 \text{ Rs.}$$

$$\boxed{\text{Usman's share} = \text{Rs. } 128,210}$$

5
19
6
114
213
19
406000
38
26
19
70
57
130

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Answer:

The share of Fatima is
Rs. 128,210, Umar, Rs. 149,579, &
Usman Rs. 128,210 respectively.

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CSS-2018, Q:6, Part-D:

Given Data:

Total property left by man = 640,000.

Debt Amount = Rs. 40,000

Amount spent on his burial = Rs. 5,000.

Net Amount = $640,000 - 40,000 - 5,000$
= 595,000 Rs.

Required:

Distribute the amount between
his widow, one daughter, and 2 sons.

Formula:

Ratio = $\frac{\text{Total amount}}{\text{Total parts}} \times \text{share of each person.}$

Solution:

According to Islamic law: the
widow share is $\frac{1}{8}$

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$$\text{Widow's share} = \frac{1}{8} (\text{Total}^{\text{net}} \text{ amount})$$

$$= \frac{1}{8} (595,000)$$

$$\boxed{\text{Widow's share} = \text{Rs. } 74375}$$

Now remaining amount:

$$\begin{aligned} \text{Remaining} &= 595,000 - 74375 \\ &= 520,625 \end{aligned}$$

$$\begin{array}{r} 595000 \\ 8 \overline{) 595000} \\ \underline{56} \\ 35 \\ \underline{32} \\ 30 \\ \underline{24} \\ 60 \\ \underline{56} \\ 40 \end{array}$$

Now, we know that as per Islamic law, the daughter's share is equal to half of the son's share. So, we can write:

Son : Son : Daughter

$$2 : 2 : 1$$

Sum of the Ratio = 5

So, share of ^{one} each part is

S	S	D
S ₁	S ₂	

$$= \frac{520,625}{5}$$

$$\text{One part share} = 104125/-$$

Hence,

$$\text{1st Son's share} = 2 \times 104125 = \text{Rs. } 208250$$

$$\text{2nd Son's share} = 2 \times 104125 = \text{Rs. } 208250$$

$$\text{Daughter's share} = 1 \times 104125 = \text{Rs. } 104125$$

Answer:

Widow's share is Rs. 74375, each son's share, Rs. 208250, & Daughter's share = Rs. 104125 respectively.

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CSS-2019, Q. 7 - Part A

Given Data:

Part-i: A lottery win of Rs. 2000, in the ratio of 1:4 b/w Moiz & Maria.

Part-ii: Moiz then share his part b/w himself, his wife & his son in the ratio of 4:5:1.

Required:

How much more money Moiz's wife gets over his son?

Formula:

$$\text{Ratio: } \frac{\text{Total Amount}}{\text{Total Ratio}} \times \text{Part of each person.}$$

Solution:

⇒ Part-i: According to given Data, the sum of ratio b/w Moiz & Maria = $1+4 \Rightarrow 5$

Now: To find the share of one part;

$$\Rightarrow \frac{\text{Total Amount}}{\text{Total Ratio}} = \frac{2000}{5} = 400$$

$$\text{Moiz share: } 1 \times 400 = \boxed{400}$$

Part-ii:

The share of Moiz is Rs. 400/.

According to given question, distribution ratio among himself, wife, & son is:

$$4:5:1$$

$$\text{The sum of ratio} = 4+5+1 = 10$$

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To find the value of one part:

$$\frac{\text{Total amount}}{\text{Total Ratio}} = \frac{400}{10} = 40$$

Now: Moiz's share:

As we know that, Moiz has 4 parts: so;

$$4 \times 40 = 160/-$$

$$\boxed{\text{Moiz's share} = \text{Rs. } 160/-}$$

Share of Moiz's wife:

$$5 \times 40 = 200/-$$

$$\boxed{\text{wife share} = \text{Rs. } 200/-}$$

Similarly share of son:

$$1 \times 40 = 40/-$$

$$\boxed{\text{son share} = \text{Rs. } 40/-}$$

$$\text{Moiz's wife share} - \text{Moiz's son share} = 200 - 40 = 160.$$

Answer:

Hence, Moiz's wife gets Rs. 160 more than their son.

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CSS-2020, Q: 8, Part - D

Given Data:

Property left by Zahid = Rs. 1750,000/-

Debt that his family has to pay = Rs. 150,000/-

Share of a son was double than that of a daughter.

Required:

How much money did each child receive?

Formula:

Ratio: $\frac{\text{Total Amount}}{\text{Total Ratio}} \times \text{Share of each person.}$

Solution:

According to the given statement:

Property left by Zahid = 1750,000/-

Debt that has to be pay = 150,000/-

So,

$$\begin{aligned} \text{Remaining Property} &= 1750,000 - 150,000 \\ &= 1600,000/- \end{aligned}$$

Now, According to given condition, the share of son was double than that of daughter, so,

Son : Daughter

2 : 1

Total / sum of ratio = $2+1 \Rightarrow 3$.

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To find the share of one part, the following formula is;

$$\text{One part share} = \frac{\text{Total Remaining Amount}}{\text{The sum of Ratios}}$$

$$= \frac{1600,000}{3}$$

$$\text{One part} = 533333$$

Share of Son:

$$= 2 \times 533333$$

$$\text{Son's share} = 1066666 \text{ rupees}$$

$$\begin{array}{r} 533333 \\ 3 \overline{) 1600000} \\ \underline{15} \\ 10 \\ \underline{9} \\ 10 \\ \underline{9} \\ 10 \\ \underline{9} \\ 1 \end{array}$$

Now:

① Daughter's share:

$$= 1 \times 533333$$

$$\text{Daughter's share} = 533333 \text{ rupees}$$

Answer:

Hence, Zahid's son receive

Rs. 1066666/- & Daughter Rs. 533333/-

respectively.

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Good answers and structure