

**Dr Oliver Mathematics**  
**Worked Examples**  
**Ratio 5**

**From:** Edexcel GCSE 2022 November Paper 3H (Calculator)

1. There are four boxes on a shelf: **A**, **B**, **C**, and **D**. (4)

The total weight of **A** and **B** is 3 times the total weight of **C** and **D**.

The weight of **A** is  $\frac{2}{3}$  of the weight of **B**.

The weight of **C** is 75% of the weight of **D**.

Find the ratio

weight of **A** : weight of **B** : weight of **C** : weight of **D**.

**Solution**

Well,

$$\mathbf{A + B = 3(C + D),}$$

$$\mathbf{A = \frac{2}{3}B, \text{ and}}$$

$$\mathbf{C = \frac{3}{4}D.}$$

Let us compare the weights in terms of **B**, shall we? Now,

$$\mathbf{A + B = 3(C + D) \Rightarrow \frac{2}{3}B + B = 3(\frac{3}{4}D + D)}$$

$$\mathbf{\Rightarrow \frac{5}{3}B = 3(\frac{7}{4}D)}$$

$$\mathbf{\Rightarrow \frac{5}{3}B = \frac{21}{4}D}$$

$$\mathbf{\Rightarrow \frac{20}{3}B = 21D}$$

$$\mathbf{\Rightarrow \frac{20}{63}B = D.}$$

Next,

$$\mathbf{C = \frac{3}{4}D \Rightarrow \frac{4}{3}C = D}$$

$$\mathbf{\Rightarrow \frac{20}{63}B = \frac{4}{3}C}$$

$$\mathbf{\Rightarrow \frac{5}{21}B = C.}$$

Finally, we have

$$\begin{aligned} & \text{weight of A : weight of B : weight of C : weight of D} \\ &= \frac{2}{3}\mathbf{B} : \mathbf{B} : \frac{5}{21}\mathbf{B} : \frac{20}{63}\mathbf{B} \end{aligned}$$

strip out **B**:

$$= \frac{2}{3} : 1 : \frac{5}{21} : \frac{20}{63}$$

we make the same common denominator:

$$\begin{aligned} &= \frac{42}{63} : \frac{63}{63} : \frac{15}{63} : \frac{20}{63} \\ &= \underline{\underline{42 : 63 : 15 : 20}}. \end{aligned}$$