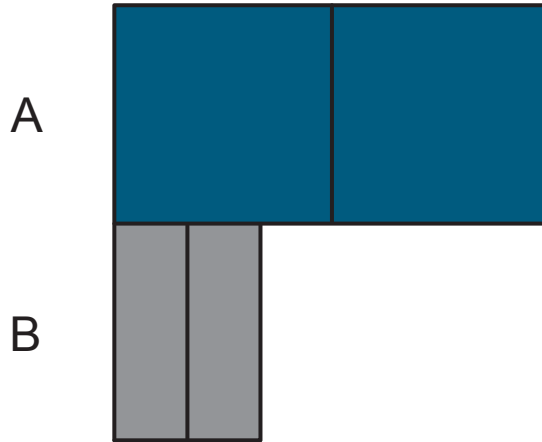


Big And Small

BAS Introduction



In **Big And Small (BAS)**, the aim is to draw models with units of different sizes (big and small), forming two sentences that describe the model, and using the technique of Cancel Same Parts (CSP) to eliminate one of the units.

Tip: Draw the big units as wide as possible and the small units as narrow as possible. Although the units in the models are **intentionally not drawn to scale**, they can actually help us to construct the two mathematical sentences more accurately without mistakenly assuming that there are any size relations between the big and small units.

BAS Example

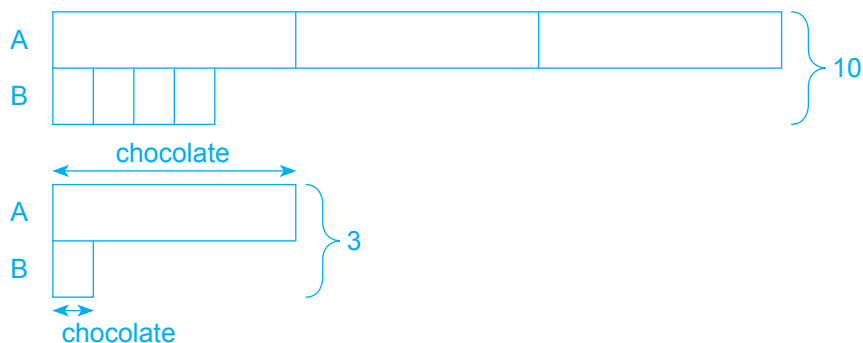
A and B have 10 cookies.

$\frac{1}{3}$ of A's cookies are chocolate cookies.

$\frac{1}{4}$ of B's cookies are chocolate cookies.

There are 3 chocolate cookies.

How many cookies does A have?



3 big units + 4 small units \rightarrow 10 cookies

1 big unit + 1 small unit \rightarrow 3 cookies

$\times 4$ 4 big units + 4 small units \rightarrow 12 cookies

4 big units $-$ 3 big units \rightarrow (12 $-$ 10) cookies

1 big unit \rightarrow 2 cookies

3 big units \rightarrow $3 \times 2 = 6$ cookies

A \rightarrow 6 cookies

Ans: 6 cookies

Adapted:

Score A* in Singapore Mathematics Problem Sums Level 6 (Advanced Edition)

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Question 1

The ratio of A's cookies to B's cookies was 2 : 5. After A bought 36 cookies and B ate 12 cookies, the ratio became 5 : 4. How many cookies were there at first?

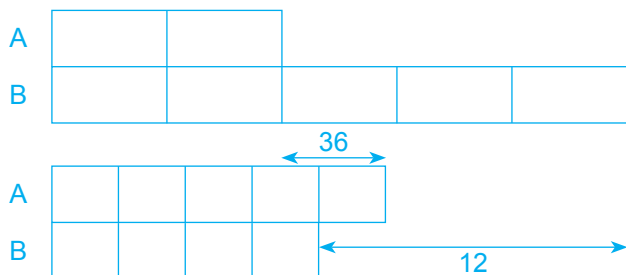
Ans: _____

Question 2

The ratio of A's cookies to B's cookies was 3 : 2. After A bought 20 cookies and B bought 160 cookies, the ratio became 1 : 2. How many cookies did B have in the end?

Ans: _____

Question 1



The small units are intentionally drawn as narrow as possible, hence the difference of 12 cookies appears wider than the difference of 36 cookies.

$$\begin{aligned} \times 4 \left\{ \begin{aligned} &5 \text{ small units} - 2 \text{ big units} \rightarrow 36 \\ &20 \text{ small units} - 8 \text{ big units} \rightarrow 144 \end{aligned} \right. \end{aligned}$$

$$\begin{aligned} \times 5 \left\{ \begin{aligned} &5 \text{ big units} - 4 \text{ small units} \rightarrow 12 \\ &25 \text{ big units} - 20 \text{ small units} \rightarrow 60 \end{aligned} \right. \end{aligned}$$

$$20 \text{ small units} - 8 \text{ big units} + 25 \text{ big units} - 20 \text{ small units} \rightarrow 144 + 60$$

$$25 \text{ big units} - 8 \text{ big units} \rightarrow 204 \text{ cookies}$$

$$17 \text{ big units} \rightarrow 204 \text{ cookies}$$

$$1 \text{ big unit} \rightarrow 204 \div 17 = 12 \text{ cookies}$$

$$7 \text{ big units} \rightarrow 7 \times 12 = 84 \text{ cookies}$$

$$\text{At first} \rightarrow 84 \text{ cookies}$$

Ans: 84 cookies

Question 2

$$\begin{aligned} \times 2 \left\{ \begin{aligned} &1 \text{ big unit} - 3 \text{ small units} \rightarrow 20 \\ &2 \text{ big units} - 6 \text{ small units} \rightarrow 40 \end{aligned} \right. \end{aligned}$$

$$\begin{aligned} \times 3 \left\{ \begin{aligned} &2 \text{ big units} - 2 \text{ small units} \rightarrow 160 \\ &6 \text{ big units} - 6 \text{ small units} \rightarrow 480 \end{aligned} \right. \end{aligned}$$

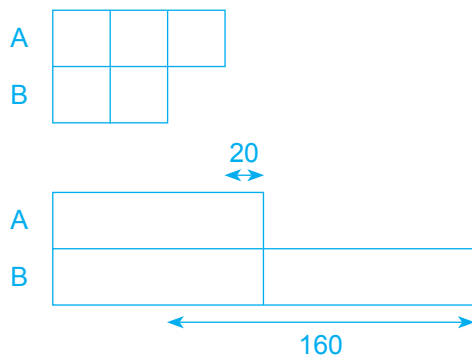
$$6 \text{ big units} - 2 \text{ big units} \rightarrow 480 - 40$$

$$4 \text{ big units} \rightarrow 440 \text{ cookies}$$

$$1 \text{ big unit} \rightarrow 440 \div 4 = 110 \text{ cookies}$$

$$2 \text{ big units} \rightarrow 2 \times 110 = 220 \text{ cookies}$$

$$\text{B (end)} \rightarrow 220 \text{ cookies}$$



Ans: 220 cookies