ADDITIONAL (OPTIONAL) SOLUTIONS FOR THE CUPCAKE PROBLEM

x : total number of cupcakes

Solution Using A Table

	Number of Cupcakes eaten	Number of Cupcakes remaining
Bob	$\frac{1}{3} \cdot x$	$x - \frac{1}{3} \cdot x = \frac{2}{3} \cdot x$
Carolyn	$\frac{1}{4} \cdot \left(\frac{2}{3} \cdot x\right) = \frac{1}{6} \cdot x$	$\frac{2}{3} \cdot x - \frac{1}{6} \cdot x = \frac{3}{6} \cdot x = \frac{1}{2} \cdot x$
Dan	$\frac{2}{3} \cdot \left(\frac{1}{2} \cdot x\right) = \frac{1}{3} \cdot x$	$\frac{1}{2} \cdot x - \frac{1}{3} \cdot x = \frac{1}{6} \cdot x$

$\frac{1}{6} \cdot x$ represents 3 cupcakes (Eva ate 1 and there were 2 remaining)

$\frac{1}{6} \cdot x = 3 \Rightarrow \boxed{x = 18}$

Algebraic Solution Using Information from the Table Above

Sum of the pieces eaten and left over = total number of cupcakes

B, C, D, E : number of cupcakes eaten by Bob, Carolyn, Dan, and Eva, respectively

$$B + C + D + E + 2 = x$$

$$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$$

$$\frac{x}{3} + \frac{x}{6} + \frac{x}{3} + 1 + 2 = x \Rightarrow \frac{5}{6} \cdot x + 3 = x \Rightarrow 3 = \frac{x}{6}$$

$$\Rightarrow \boxed{x = 18}$$

A Different Algebraic Solution

B, C, D, E : number of cupcakes eaten by Bob, Carolyn, Dan, and Eva, respectively

Number of cupcakes remaining after B, C, D, and E = 2

$$X \cdot \frac{2}{3} \cdot \frac{3}{4} \cdot \frac{1}{3} - 1 = 2$$

what was left after Bob

what was left after Carolyn

what was left after Dan

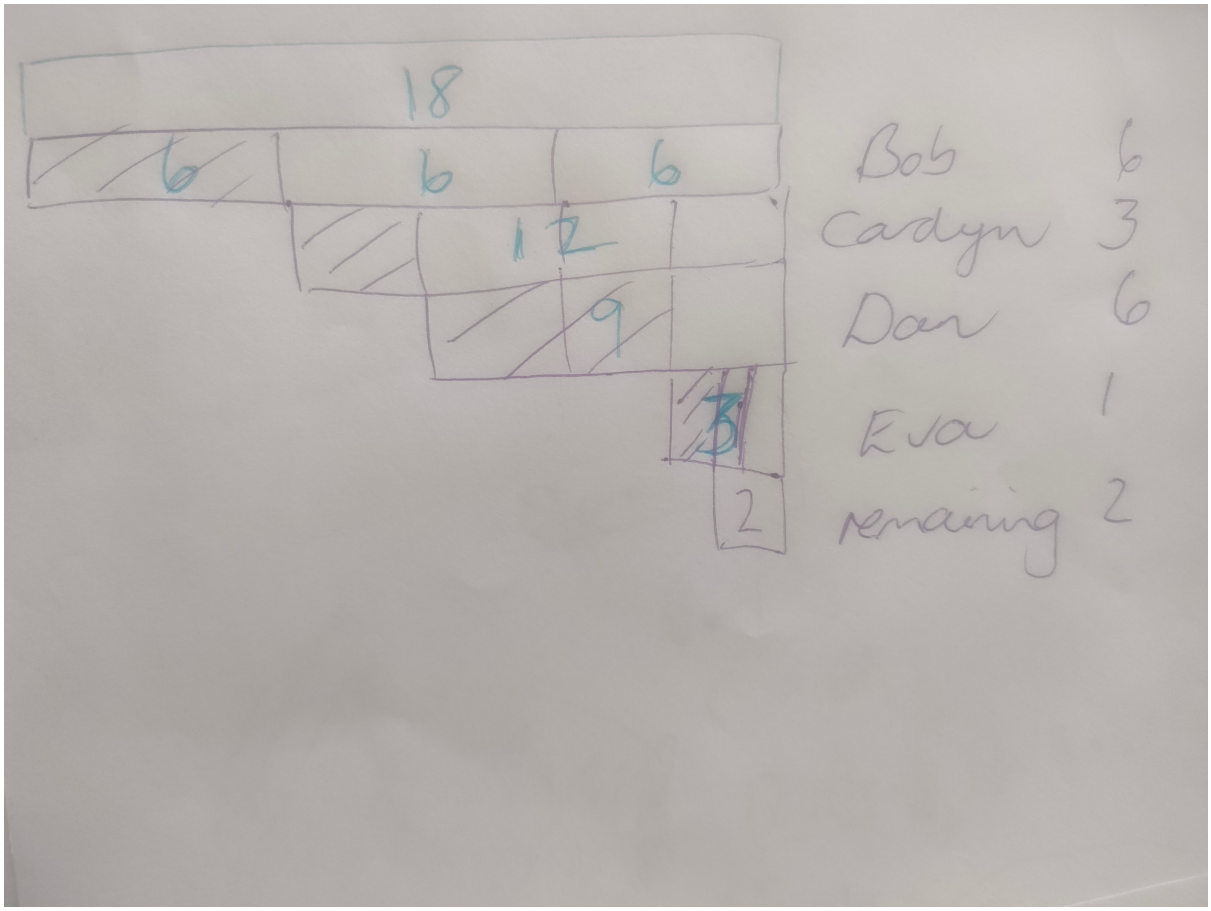
what was left after Eva

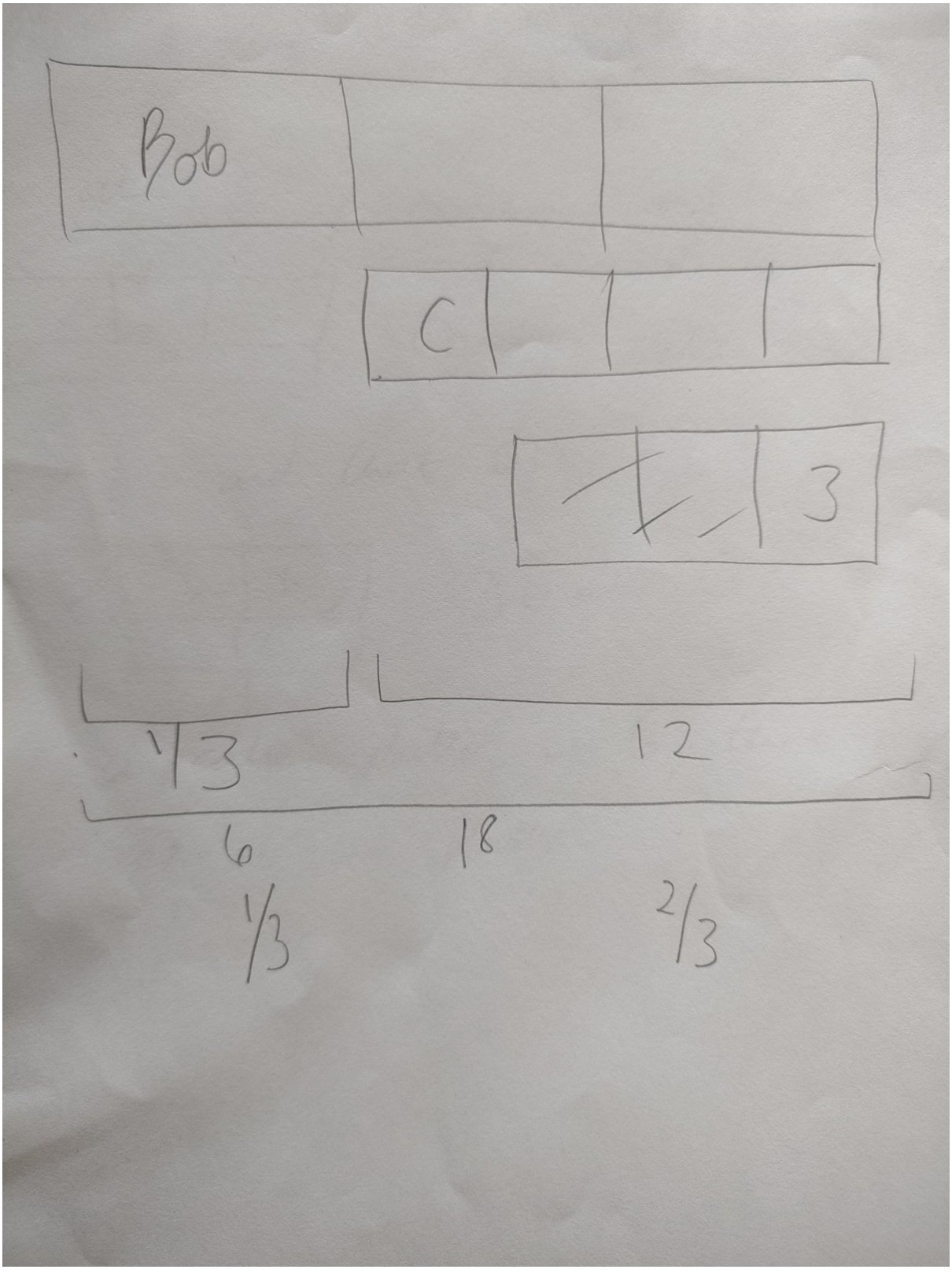
$$\frac{X}{6} - 1 = 2$$

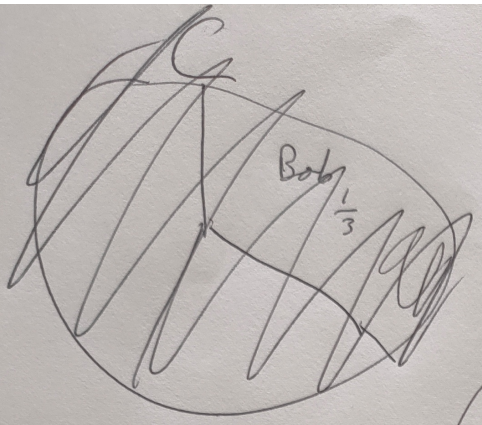
$$\frac{X}{6} = 3$$

$$\boxed{X = 18}$$

Solutions from Teachers who Worked on the Cupcake Problem


18
6
6
6
12
9
3
2
Bob 6
Carolyn 3
Dan 6
Eva 1
remaining 2


Bob
C
3
1/3
12
6
18
1/3
2/3



B = 1/3

C = 2/3 of 1/4 = 2/12 (a quarter of 2/3)

D = (1/3 + 2/12) 2/3 = 2/3 × 1/2 = 1/3

E = 1

A = 2

3 remain

$B+C+D = \frac{1}{3}+\frac{2}{12}+\frac{1}{3} = \frac{10}{12}$ BCD is $\frac{10}{12}$ of the total cupcakes

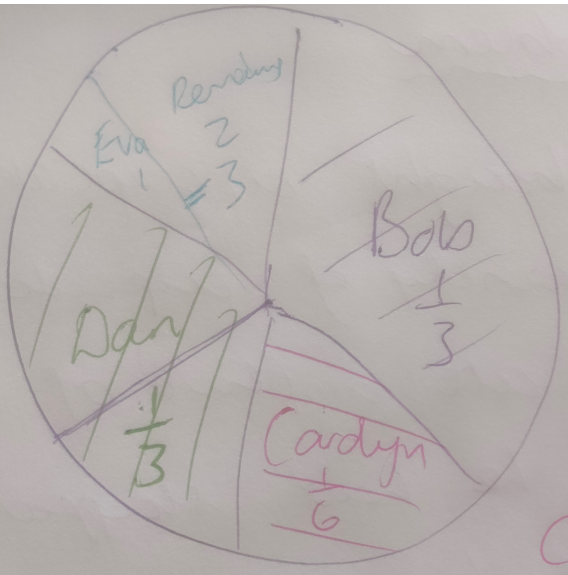
$x \times \frac{2}{12} = 3$ ← remaining

total ↗

$2x = 36$

$x = 18$

A	B	C	D	E
2	6	3	6	1



$\frac{1}{6} = 3$ therefore whole is 18

Bob ate $\frac{1}{3}$ of 18 = 6

Cardyn ate $\frac{1}{6}$ of 18 = 3

Dan ate $\frac{1}{3}$ of 18 = 6

Eva - 1

Alex - 2 left.

Working Backwards

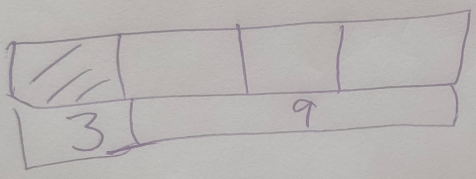
Alex has 2 cupcakes remaining.

Eva ate 1

Dan ate $\frac{2}{3}$ of remaining quantity and that left 3.

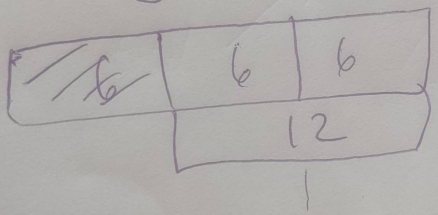
$\frac{1}{3} = 3 \Rightarrow$ Dan ate 6

Cardyn ate $\frac{1}{4}$ of remaining and that left



Cardyn ate 3

Bob ate $\frac{1}{3}$ and that left 12



Bob ate 6.

If $\frac{1}{3}$ of cupcake platter is 6, there 18 cakes on the platter.