

My Sketch Solution

Question 1

Take a look at the problem. If the number in the square is the **mean** of the numbers around it,

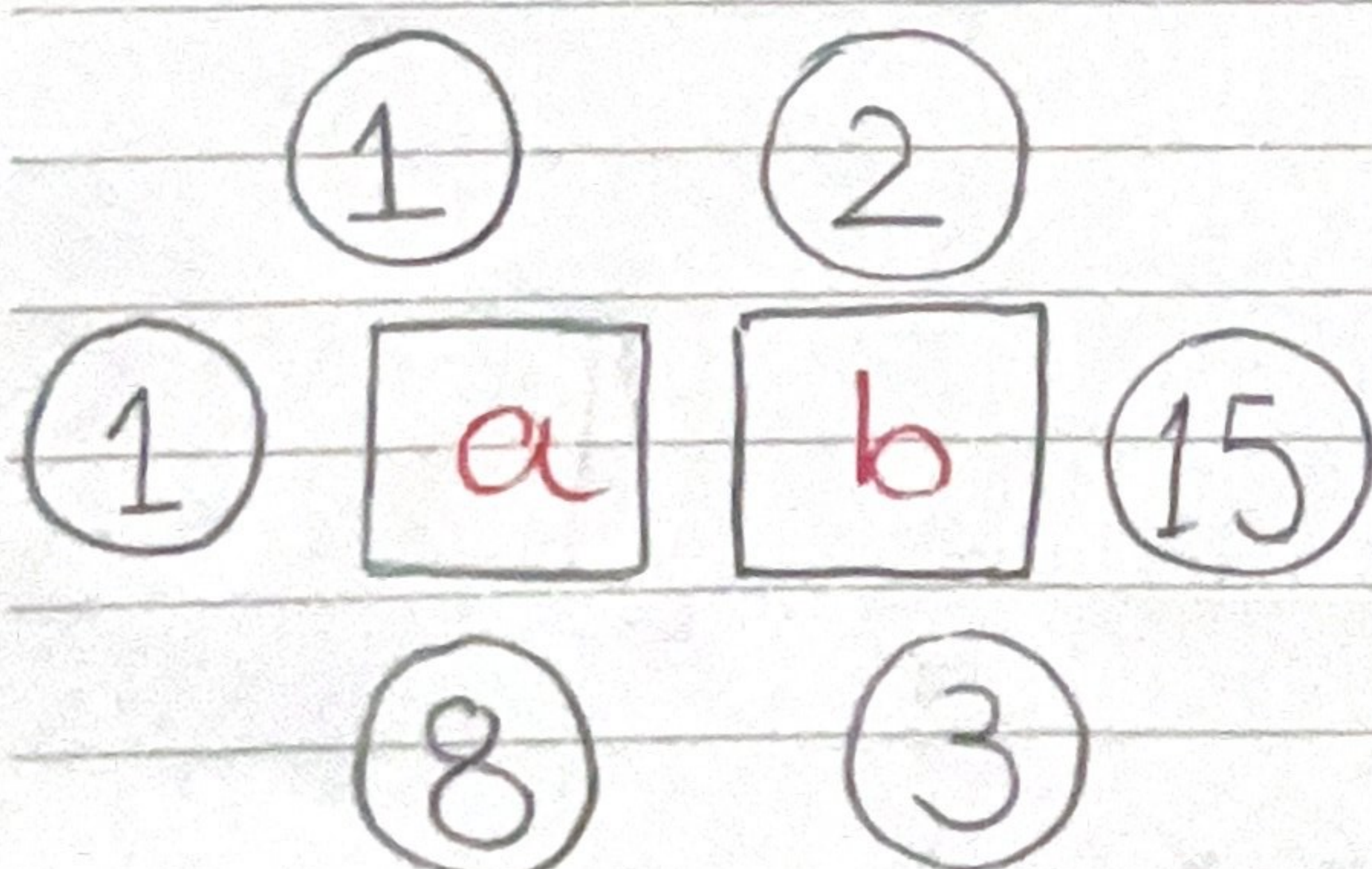
$$\text{mean} = \frac{\text{Sum of numbers around the square}}{\text{number of values around the square}} \quad (\text{arithmetic average})$$

$$= \frac{9+8+0+3}{4} = \frac{20}{4} = 5$$

$\therefore$ the number on a square is 5

Question 2

This is a little more tricky. Let's draw it out:



Because we don't know the values on the boxes, let's label them **a** and **b** respectively.

Then, set some equations via the **mean formula** above:

$$\begin{cases} a = \frac{1+1+8+b}{4} \dots \textcircled{1} \\ b = \frac{2+a+3+15}{4} \dots \textcircled{2} \end{cases}$$

Simplify them

$$a = \frac{10+b}{4} \dots \textcircled{3}$$

$$b = \frac{a+20}{4} \dots \textcircled{4}$$

$$\textcircled{3} \times 4 \Rightarrow 4a = 10 + b$$

$$\textcircled{4} \times 4 \Rightarrow 4b = a + 20$$

Rearrange all variables to one side

$$4a - b = 10 \dots \textcircled{5}$$

$$-a + 4b = 20 \dots \textcircled{6}$$

So a has a coefficient of -4, $\textcircled{6} \times 4 \Rightarrow -4a + 16b = 80 \dots \textcircled{7}$

Using elimination to solve the equations simultaneously

$$\textcircled{5} + \textcircled{7} =$$

$$\begin{array}{r} 4a - b = 10 \\ + 4a + 16b = 80 \\ \hline \end{array}$$

$$\begin{array}{r} 15b = 90 \\ \div 15 \\ \hline b = 6 \end{array}$$

We have b
by itself now
by cancelling out
 a

Substitute $b = 6$ into any equation (I chose $\textcircled{5}$)

$$\begin{array}{r} 4a - 6 = 10 \\ +6 \\ \hline 4a = 16 \\ \div 4 \\ \hline a = 4 \end{array}$$

$$\begin{cases} a = 4 \\ b = 6 \end{cases}$$

so let's put these back in context!

$$\begin{array}{cc} \textcircled{1} & \textcircled{2} \\ \textcircled{1} & \boxed{4} \quad \boxed{6} & \textcircled{15} \\ \textcircled{8} & \textcircled{3} \end{array}$$

let's check if our
solution was correct!

$$\frac{1 + 1 + 8 + 6}{4} = \frac{16}{4} = 4$$

$$a = 4 \quad \checkmark$$

$$\frac{2 + 4 + 3 + 15}{4} = \frac{24}{4} = 6$$

$$b = 6 \quad \checkmark$$

Therefore, we were correct! Thank you for
reading my solution.