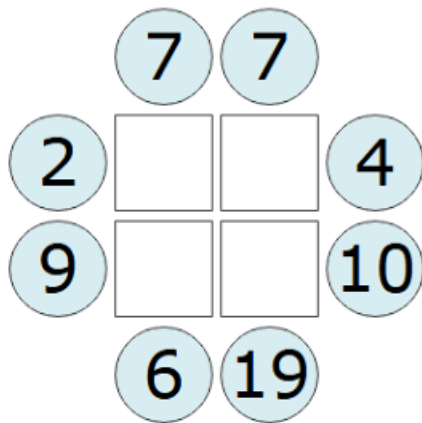




Name: Ayaansh

Math Homework: Connecting Averages (Puzzle 1)

How I figured it out:

This puzzle has a grid of 4 boxes in a square! Each box has 2 circles next to it, and it also touches 2 other boxes.

Let's give each box a letter name so it is easy to track:

- **A** is the top-left box.
- **B** is the top-right box.
- **C** is the bottom-left box.
- **D** is the bottom-right box.

My Equations for each box:

For box A: The numbers around it are circles 7 and 2, plus boxes B and C.

$$4 \times A = 7 + 2 + B + C$$

$$4 \times A = 9 + B + C \text{ (Equation 1)}$$

For box B: The numbers around it are circles 7 and 4, plus boxes A and D.

$$4 \times B = 7 + 4 + A + D$$

$$4 \times B = 11 + A + D \text{ (Equation 2)}$$

For box C: The numbers around it are circles 9 and 6, plus boxes A and D.

$$4 \times C = 9 + 6 + A + D$$

$$4 \times C = 15 + A + D \text{ (Equation 3)}$$

For box D: The numbers around it are circles 10 and 19, plus boxes B and C.

$$4 \times D = 10 + 19 + B + C$$

$$4 \times D = 29 + B + C \text{ (Equation 4)}$$

Finding the numbers:

First, I notice that the right side of Equation 1 and Equation 4 both use (B + C)!

$$4 \times D = 29 + B + C$$

Since $9 + B + C = 4 \times A$, then $B + C = (4 \times A) - 9$.

$$\text{So, } 4 \times D = 29 + (4 \times A) - 9$$

$$4 \times D = 20 + 4 \times A$$

Divide everything by 4: **$D = 5 + A$**

Next, I compare Equation 2 and Equation 3. Both use (A + D)!

$$4 \times C = 15 + A + D$$

$$4 \times B = 11 + A + D$$

If we subtract them: $(4 \times C) - (4 \times B) = 15 - 11 = 4$.

Divide by 4: **$C - B = 1$** , which means **$C = B + 1$** .

Now let's put **$D = 5 + A$** into Equation 2:

$$4 \times B = 11 + A + (5 + A)$$

$$4 \times B = 16 + 2 \times A$$

Divide by 2: $2 \times B = 8 + A$, so **$A = 2 \times B - 8$** .

Now let's use Equation 1 with our new clues ($C = B + 1$ and $A = 2 \times B - 8$):

$$4 \times (2 \times B - 8) = 9 + B + (B + 1)$$

$$8 \times B - 32 = 10 + 2 \times B$$

Move the B's to one side and numbers to the other:

$$6 \times B = 42$$

$$B = 42 \div 6$$

$$\mathbf{B = 7}$$

Now I can find all the other boxes easily!

$$\bullet \mathbf{C = B + 1 = 7 + 1 \rightarrow C = 8}$$

$$\bullet \mathbf{A = 2 \times 7 - 8 = 14 - 8 \rightarrow A = 6}$$

$$\mathbf{D = 5 + A = 5 + 6 \rightarrow D = 11}$$

My Final Answers:

$$\text{Top-Left Box (A) = 6}$$

$$\text{Top-Right Box (B) = 7}$$

$$\text{Bottom-Left Box (C) = 8}$$

$$\text{Bottom-Right Box (D) = 11}$$

Checking my answers:

- Top-Left Box: $(7 + 2 + 7 + 8) \div 4 = 24 \div 4 = 6$. (Works!)
- Top-Right Box: $(7 + 4 + 6 + 11) \div 4 = 28 \div 4 = 7$. (Works!)
- Bottom-Left Box: $(9 + 6 + 6 + 11) \div 4 = 32 \div 4 = 8$. (Works!)
- Bottom-Right Box: $(10 + 19 + 7 + 8) \div 4 = 44 \div 4 = 11$. (Works!)