Solutions

1 ***Method :*** *Rearrange the question and subtract the expressions.*

Notice that:

$$
\begin{array}{rcl}
1^2 + 2^2 + 3^2 + 4^2 + \ldots + 23^2 + 24^2 + 25^2 & = & 5525 \\
-\ (1^2 + 3^2 + 5^2 + 7^2 + \ldots + 21^2 + 23^2 + 25^2) & = & 2925 \\
\hline
2^2 + 4^2 + 6^2 + 8^2 + \ldots + 20^2 + 22^2 + 24^2 & = & 2400
\end{array}
$$

We have known that $2^2 + 4^2 + 6^2 + \ldots + 20^2 + 22^2 = N$.
So $N + 24^2 = 2400$.
We have $N = 2400 - 24^2 = 2400 - 576 = 2024$.

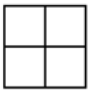
Answer is $N = 2024$.

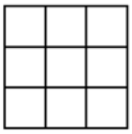
Solutions

2

Method 1 : *Calculate the square by the size of squares.*

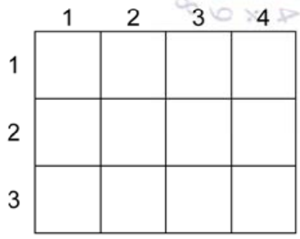
 = 12

 = 2

 = 6

So, there are 12 + 6 + 2 = **20 squares in total.**

Method 2 : *Use formula to count the square.*



Number of vertical column		Number of horizontal column	Number of Square
4	×	3	12
3	×	2	6
2	×	1	2
1	×	0	0
		Total Sum =	**20**

Solutions

3 ***Method 1 :*** *Make a table.*

Make a table of some of the costs the bag might have.

Let C = cost of the bag, and A and B be the respective amounts that Anna and Bella have.

If the bag costs RM 60, together they will have enough to purchase the bag.

The most the bag could cost if they together do not have enough money to purchase the ruler is RM 59.

C	A	B	$A + B$
RM 57	RM 5	RM 49	RM 54
RM 58	RM 6	RM 50	RM 56
RM 59	**RM 7**	**RM 51**	**RM 58**
RM 60	RM 8	RM 52	RM 60

Method 2 : *Use algebra.*

Suppose the bag costs R.

Then Anna has $R - 52$, Bella has $R - 8$, and together they have $2R - 60$.

But this sum is still not enough to pay for the bag.

Given	(1)	$2R - 60 < R$
Subtract R from both sides of (1)	(2)	$R - 60 < 0$
Add 60 to both sides of (2)	(3)	$R < 60$

Since R is less than 60, the most ***R* could be is RM 59.**

Solutions

4 **Method :** *Analyse the possibility of each alphabet.*

$$\begin{array}{cccc} & 1^{st} & 2^{nd} & 3^{rd} \\ & 1 & B & C \\ \times & & & D \\ \hline & D & 9 & B \end{array}$$

From the first column 1 × *D* = *D*, we know that *B* × *D* in the second column does not exceed 10.

That leaves us *D* × *B* = 2 × 3 or *D* × *B* = 3 × 2
or *D* × *B* = 2 × 4 or *D* × *B* = 4 × 2.

The bottom of column 2 is 9. This is impossible to get 9 using 3 × 2.
Hence it can only be 2 × 4 or 4 × 2, 8 + 1 (carry from 3rd column) = 9.

If *D* = 4 and *B* = 2, then *C* must be 3.
If *D* = 2 and *B* = 4, then *C* must be 7.

$$\begin{array}{cccc} & 1 & B & C \\ \times & & & D \\ \hline & D & 9 & B \end{array} \qquad \begin{array}{cccc} & 1 & 4 & 7 \\ \times & & & 2 \\ \hline & 2 & 9 & 4 \end{array} \qquad \begin{array}{cccc} & 1 & 2 & 3 \\ \times & & & 4 \\ \hline & 4 & 9 & 2 \end{array}$$

***BC* represents 23 or 47.**

Solutions

5 **Method 1 :** *Analyse the sum of two groups of numbers.*

Notice that the average of three consecutive natural numbers is exactly the number in the middle from those three consecutive natural numbers.
The difference between both average number is 5, the difference between both smallest number and greatest number is 5 + 5 = 10.

Hence, the difference of the sum of the two groups is 15.

Then the sum of the first group is (57 - 15) ÷ 2 = 21.
Check that 6 + 7 + 8 = 21.

Then the greatest number from the second group is 8 + 5 = **13.**

Method 2 : *Use algebra.*

Let M denote the average of first group, then $M + 5$ is the average of the second group.
Solve $3M + 3 (M + 5) = 57$, we have $M = 7$.

Then the average of the second group is 7 + 5 = 12.
The average of three consecutive natural numbers is the number in the middle of those three consecutive natural numbers.

Thus, the greatest number from the second group is 12 + 1 = **13.**