**Guess and Check / Supposition Method**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Class: Teamwork 6**

**Guess and Check Method**

One of the more important and effective problem-solving techniques is Guess and Check. It is also known as Trial and Error. As the name suggests, you have to guess the answer to a problem and check if that guess is correct. If the guess is wrong, you will make another guess. This will continue until the guess is correct.

It is beneficial to keep a record of all the guesses and checks in a table. This will enable you to analyse your guess (if it is too high or too low) and improve on the next guess.

Be careful though, this problem-solving technique can be tiresome without systematic or logical guesses.

**Example 1**

There are 24 sheep and chickens on a farm. There are a total of 78 legs. How many of each kind of animal were there?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. of Sheep | Sheep Legs | No. of Chickens | Chicken legs | Total No. of legs | Check |
| 1 | 4 | 23 | 46 | 50 | x |
| 2 | 8 | 22 | 44 | 52 | x |
| 3 | 12 | 21 | 42 | 54 | x |
| 4 | 16 | 20 | 40 | 56 | x |
| 5 | 20 | 19 | 38 | 58 | x |
| 6 | 24 | 18 | 36 | 60 | x |
| … | … | … | … | … | … |
| 15 | 60 | 9 | 18 | 78 | √ |

Answer: There are **15** Sheep and **9** Chickens

You might make many guesses before you come to your final answer. However, you can come to a solution in just 3 steps if you make a calculated guess. See the next page:

As normal, draw the table and carry out two guesses in which the difference in the animal of your choice is only 1. For this example, I will increase the number of sheep legs because I need more legs.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. of Sheep | Sheep Legs | No. of Chickens | Chicken legs | Total No. of legs | Check |
| 1 | 4 | 23 | 46 | 50 | x |
| 2 | 8 | 22 | 44 | 52 | x |

After getting to this step, it is noted that for every additional sheep, the total number of legs increase by 2. In order to reach 78 legs from 50 legs (1 sheep), there must be 28 more legs. (28 ÷ 2 = 14) There must be 14 more sheep in order to get 78 legs.

Therefore, add one more row to your table with the calculated guess.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. of Sheep | Sheep Legs | No. of Chickens | Chicken legs | Total No. of legs | Check |
| 1 | 4 | 23 | 46 | 50 | x |
| 2 +14 | 8 | 22 -14 | 44 | 52 | x |
| 15 | 60 | 9 | 18 | 78 | √ |

**Example 2**

There are 30 tricycles and bicycles in a shop. The total number of wheels is 81. How many tricycles are there?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. of tricycles | Tricycle wheels | No. of bicycles | Bicycle Wheels | Total No. of wheels | Check |
| 1 | 3 | 29 | 58 | 61 | x |
| 2 | 6 | 28 | 56 | 62 | x |

For every additional tricycle, the total number of wheels would increase by 1. So, to get from 61 wheels (1 tricycle) to 81 wheels, 20 more wheels are needed.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. of tricycles | Tricycle wheels | No. of bicycles | Bicycle Wheels | Total No. of wheels | Check |
| 1 | 3 | 29 | 58 | 61 | x |
| 2 +20  | 6 | 28 | 56 | 62 +20 | x |
| 21 | 63 | 9 | 18 | 81 | √ |

Answer: There are 21 Tricycles.

**Supposition Method**

For those who find the Guess and Check method too tedious to do because of having to draw a table, the Supposition Method is another effective method to use. Being commonly known as “making an assumption”, you are to make assumptions to eliminate some possibilities and simplify the word problem.

 Using the same question:

**Example 3a**

There are 24 sheep and chickens on a farm. There are a total of 78 legs. How many of each kind of animal were there?

Make an assumption

**Assume all the 24 animals are sheep,**

Test your assumption

**Number of sheep legs 🡪 24 x 4 = 96 legs.**

Check to see how far your

value is from the one given

**Extra legs 🡪 96 – 78 = 18 legs.**

There are extra legs because some chicken are assumed to be sheep.

Changing your sheep back to chickens 🡪 remove 2 legs from each sheep.

**Number of chickens 🡪 18 ÷ 2 = 9 Chickens**

**Number of Sheep 🡪 24 – 9 = 15 Sheep**

**The important thing is understanding the reason for having extra legs.**

**-2 legs**

When you assumed that all are sheep, you actually counted 2 extra legs for each chicken present. That is why you have extra legs. That is why you divide by 2.

You also can assume all are chickens if you want. (eliminate one of the variables first)

See next page:

**Example 3b**

There are 24 sheep and chickens on a farm. There are a total of 78 legs. How many of each kind of animal were there?

Make an assumption

**Assume all the 24 animals are chickens,**

Test your assumption

**Number of chicken legs 🡪 24 x 2 = 48 legs**

Check to see how far your

value is from the one given

**Missing legs 🡪 78 - 48 = 30 legs.**

There are missing legs because some sheep are assumed to be chickens.

Changing your chickens back to sheep 🡪 adding 2 more legs to each chicken.

**Number of sheep 🡪 30 ÷ 2 = 15 sheep**

**Number of chicken 🡪 24 – 15 = 9 chickens**

**The important thing is understanding the reason for having missing legs.**

**+2 legs**

When you assumed that all are chickens, you actually counted 2 less legs for each sheep present. That is why you have missing legs. That is why you divide by 2.

**Example 4**

There are 30 tricycles and bicycles in a shop. The total number of wheels is 81. How many tricycles are there?

Assume all are tricycles,

Total wheels 🡪 30 x 3 = 90 wheels

Extra wheels 🡪 90-81 = 9 wheels

Number of bicycles 🡪 9 ÷ 1 = 9 bicycles

Number of tricycles 🡪 30-9=21 tricycles

There are 21 Tricycles.

Assume all are bicycles,

Total wheels 🡪 30 x 2 = 60 wheels

Missing wheels 🡪 81-60 = 21 wheels

Number of Tricycles 🡪 21 ÷ 1 = 21 Tricycles

There are 21 Tricycles.