

LESSON 2: Guess and Check

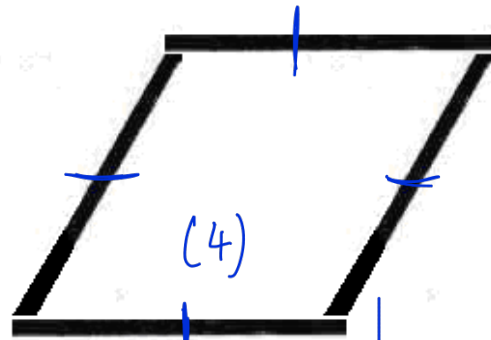
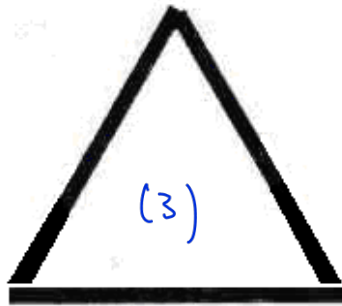
Guess and Check

Guess and Check is used when the information given in the question cannot be used directly.

- The method involves drawing a table and the four operations.
- The table is filled in to see if the conditions can be met.

GUIDED EXAMPLE 1

- { Total TP
 (Andy used 414 toothpicks to construct some rhombuses and triangles.)
{ He used 1 toothpick for each side of the rhombus or triangle constructed. } value
{ He constructed 132 figures altogether. } Total No.
 How many triangles and rhombuses did he construct?



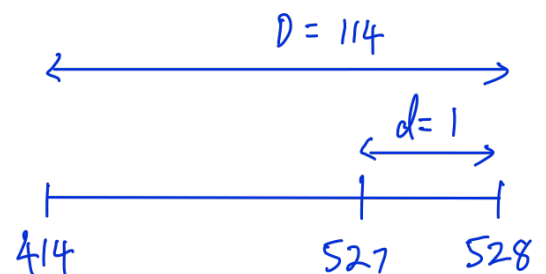
No.	TP	No.	TP	Total TP (414)	Check
0	0	132	528	$0 + 528 = 528$	X
1	3	131	524	$3 + 524 = 527$	X d
<u>114</u>	342	<u>18</u>	72	$342 + 72 = 414$	✓ D

$$D : 528 - 414 = 114$$

$$d : 528 - 527 = 1$$

$$D \div d : 114 \div 1 = 114$$

move 114 steps down.



Ans : 114 Triangles, 18 Rhombuses

GUIDED EXAMPLE 2

Ali was asked how many goats and chickens were there in a farm. He answered: "Among the animals, there are 630 eyes and 822 legs." How many of each kind of animals were there?

$$\begin{aligned} \text{Total no. animals} &= 630 \div 2 \\ &= 315 \end{aligned}$$

Goats (4 legs)		Chickens (2 legs)		Total Legs (822)	Check
No.	Legs	No.	Legs		
315	1260	0	0	$1260 + 0 = 1260$	X
314	1256	1	2	$1256 + 2 = 1258$	$\downarrow d$ $\left. \begin{array}{l} \\ \end{array} \right) D$
<u>96</u>	384	<u>219</u>	438	$384 + 438 = 822$	

$$D: 1260 - 822 = 438$$

$$d: 1260 - 1258 = 2$$

$$D \div d: 438 \div 2 = 219$$

Ans: 96 goats, 219 chickens

GUIDED EXAMPLE 3

There were a total of 100 spiders and chickens on a piece of land. ^{Total no.}]
 The number of legs that all the spiders have is 150 more than the number of legs that all the chickens have.] Diff in total legs
 How many more chickens are there than spiders?
 (A chicken has 2 legs and a spider has 8 legs)] value

Spider (8)		Chicken (2)		SL - CL (150)	Check
No.	Legs	No.	Legs		
100	800	0	0	$800 - 0 = 800$	✗
99	792	1	2	$792 - 2 = 790$	✗
35	280	65	130	$280 - 130 = 150$	✓

$\downarrow d$
 $\downarrow D$

$D : 800 - 150 = 650$

$d : 800 - 790 = 10$

$D \div d : 650 \div 10 = 65$

$65 - 35 = 30$

Ans : 30

GUIDED EXAMPLE 4

[A height survey was conducted among 60 pupils.]

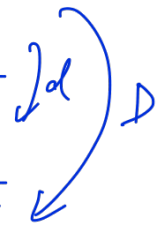
The average height of the pupils is 151.25cm.

[Given that the average height of the boys and girls was 160 cm and 145 cm respectively, find the number of boys and the number of girls.]

$$\text{Average Height value} = \frac{\text{Total Height}}{\text{Total no. pupils}}$$

$$\begin{aligned} \text{Total height} &= \text{Total no. pupils} \times \text{Average height} \\ &= 60 \times 151.25 \\ &= 9075 \end{aligned}$$

Boys (160 cm)		Girls (145 cm)		Total height (9075 cm)	Check
No.	Height	No.	Height		
60	9600	0	0	$9600 + 0 = 9600$	X
59	9440	1	145	$9440 + 145 = 9585$	X
25	4000	35	5075	$4000 + 5075 = 9075$	✓



$$D: 9600 - 9075 = 525$$

$$d: 9600 - 9585 = 15$$

$$D \div d: 525 \div 15 = 35$$

Ans: 25 boys, 35 girls

GUIDED EXAMPLE 5

+ -

There are 30 multiple choice questions in a contest. Total no.
 5 marks are awarded for each correct answer. } values
 3 marks are deducted for each incorrect answer. }
 No marks are awarded for questions left unanswered. }
 If a student scores 78 marks in this contest, Total score
 what is the greatest possible number of questions he answered correctly?

Correct (+5)		Wrong (-3)		Total marks (78)	Check
No.	Marks	No.	marks		
30	150	0	0	$150 - 0 = 150$	X
29	145	1	-3	$145 - 3 = 142$	X
21	105	9	-27	$105 - 27 = 78$	✓

$\downarrow d$
 D

$D : 150 - 78 = 72$

$d : 150 - 142 = 8$

$D \div d : 72 \div 8 = 9$

Ans : 21

BUILD YOUR UNDERSTANDING!

1. A fruit seller bought 280 kg of grapes and peaches. ^{Total no.}
 Given that grapes cost \$2 per kg and peaches cost \$4 per kg. ^{value}
 If he spent \$891 altogether, how many kilograms of each fruit did he buy?

Grapes (\$2)		Peaches (\$4)		Total \$	Check
kg	\$	kg	\$	(\$891)	
280	560	0	0	$560 + 0 = 560$	X
279	558	1	4	$558 + 4 = 562$	X $\downarrow d$
114.5	229	165.5	662	$229 + 662 = 891$	✓

$D : 891 - 560 = 331$

$d : 562 - 560 = 2$

$D \div d : 331 \div 2 = 165.5$

P5 Heuristics Approach to Problem Solving

Guess and Check

2. There are 60 questions in a science quiz. Total No.
5 marks are awarded for each question answered correctly. values
2 marks are deducted for each wrong answer.
 Assuming that Ricky attempts all the questions, what is the minimum number of questions he must answer correctly if he wants to score at least 200 marks? Total marks

Correct (+5)		Wrong (-2)		Total marks (at least 200)	Check
No.	Marks	No.	Marks		
60	300	0	0	$300 + 0 = 300$	✓
59	295	1	-2	$295 - 2 = 293$	✓ ↓ d
<u>46</u>	230	14	-28	$230 - 28 = 202$	✓
45	225	15	-30	$225 - 30 = 195$	✗

$$D : 300 - 200 = 100$$

$$d : 300 - 293 = 7$$

$$D \div d : 100 \div 7 = 14 \frac{2}{7}$$

Test out moving 14 or 15 steps down. Ans: 46

P5 Heuristics Approach to Problem Solving

Guess and Check

3. The average weight of 50 patients at a clinic is 55.1 kg. ^{Total no.}
 The average weight of a male patient and a female patient is 65 kg and 50 kg respectively. ^{values}
 How many males are there in the clinic?

$$\begin{aligned} \text{Total weight} &= 50 \times 55.1 \\ &= 2755 \end{aligned}$$

Males (65 kg)		Females (50 kg)		Total weight (2755 kg)	Check
No.	Weight	No.	Weight		
50	3250	0	0	$3250 + 0 = 3250$	X
49	3185	1	50	$3185 + 50 = 3235$	X $\downarrow d$
<u>17</u>	1105	33	1650	$1105 + 1650 = 2755$	✓

$$D : 3250 - 2755 = 495$$

$$d : 3250 - 3235 = 15$$

$$D \div d : 495 \div 15 = 33$$

$$\text{Ans : } \underline{17}$$

P5 Heuristics Approach to Problem Solving

Guess and Check

4. There were ^{Total no.} 25 baskets of durians and dragonfruits.
 Each basket of dragonfruit weighed 13 kg while each basket of durians weighed 20 kg.] values
 The durians weighed 269 kg more than the dragonfruits.] Diff in Total Mass
 How many baskets of dragonfruits were there?

Durians (20kg)		Dragonfruits (13kg)		Durian mass - DF mass (269 kg)	Check
No.	Mass	No.	mass		
25	500	0	0	$500 - 0 = 500$	X
24	480	1	13	$480 - 13 = 467$	X
18	360	<u>7</u>	91	$360 - 91 = 231$	✓

$$D : 500 - 269 = 231$$

$$d : 500 - 467 = 33$$

$$D \div d : 231 \div 33 = 7$$

Ans : 7

P5 Heuristics Approach to Problem Solving

Guess and Check

5. Annie has 351 coins of ^{Total no.} 20-cent coins, 50-cent coins and 10-cent coins. ^{values}
 [The total amount of all these coins is \$114.60.] ^{Total value}
 [The number of 20-cent coins and 10-cent coins is the same.] *
 How many 50-cent coins does she have?

10¢ coins		20¢ coins		50¢ coins		Total value (\$114.60)	Check
No.	\$	No.	\$	No.	\$		
0	0	0	0	351	175.50	$0 + 0 + 175.50 = 175.50$	X
1	0.10	1	0.20	349	174.50	$0.10 + 0.20 + 174.50 = 174.80$	X ^d
87	8.70	87	17.40	177	88.50	$8.70 + 17.40 + 88.50 = 114.60$	✓

$$D: 175.50 - 114.60 = 60.90$$

$$d: 175.50 - 174.80 = 0.70$$

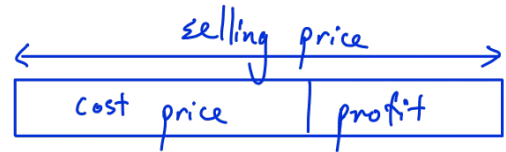
$$D \div d: 60.90 \div 0.70 = 87$$

$$\text{Ans: } \underline{177}$$

P5 Heuristics Approach to Problem Solving

Guess and Check

6. Ali bought 760 apples at \$0.30 each.
He then threw away 86 rotten apples and arranged the rest into two baskets.
The big apples were sold at \$0.60 each and the small apples were sold at \$0.40 each. *values*
He sold all the apples and earned a profit of \$129.60.
How many big apples did he sell?



$$\begin{aligned} \text{Total cost} &= 760 \times 0.30 \\ \text{price} &= 228 \end{aligned}$$

$$\begin{aligned} \text{Total \$} &= 228 + 129.60 \\ \text{collected} &= 357.60 \quad \checkmark \end{aligned}$$

$$\begin{aligned} \text{Total no.} &= 760 - 86 \\ \text{apples sold} &= 674 \quad \checkmark \end{aligned}$$

Suppose that all 674 apples sold were small apples.

$$674 \times 0.40 = 269.60$$

$$D: 357.60 - 269.60 = 88$$

$$d: 0.60 - 0.40 = 0.20$$

$$D \div d: 88 \div 0.20 = 440$$

Replace 440 small apples with 440 big apples.

$$\therefore \text{No. big apples} = 440$$

Ans: 440