1.5 Patterns and Relationships in Tables

At Home
At School

Quick Review

➤ You can make a table of values for a relation such as: $2n + 5$ is related to n
Choose values for n. These are Input numbers.
Substitute each value of n in $2n + 5$ to get the Output numbers.

When $n = 1$, $2n + 5 = 2(1) + 5$
$= 7$

When $n = 2$, $2n + 5 = 2(2) + 5$
$= 9$

When $n = 3$, $2n + 5 = 2(3) + 5$
$= 11$

When $n = 4$, $2n + 5 = 2(4) + 5$
$= 13$

Here is the table:

Input n	Output $2n + 5$
1	7
2	9
3	11
4	13

➤ You can find a relation given its table of values.

	Input	Output	
	1	2	
+1	2	6	+4
+1	3	10	+4
+1	4	14	+4
+1	5	18	+4

Let n represent any Input number.
When n increases by 1, the Output number increases by 4.
This means that the expression for the Output numbers contains $4n$.
So, compare the Output numbers to multiples of 4: 4, 8, 12, 16, 20, . . .
Each Output number is 2 less than a multiple of 4.
So, the output is $4n - 2$.
The table shows how $4n - 2$ relates to n.

Practice

1. **a)** Evaluate the expression $3n + 1$.

When $n = 1$, $3n + 1 = 3(1) + 1$

$= \_\_\_\_$

When $n = 2$, $3n + 1 = 3(2) + 1$

$= \_\_\_\_$

When $n = 3$, $3n + 1 = 3(3) + \_\_\_\_$

$= \_\_\_\_$

When $n = 4$, $3n + 1 = 3(\_\_\_\_) + \_\_\_\_$

$= \_\_\_\_$

When $n = 5$, $3n + 1 = 3(\_\_\_\_) + \_\_\_\_$

$= \_\_\_\_$

b) Complete the table. Use your results from part a.

Input n	Output $3n + 1$
1	
2	
3	
4	
5	

2. Complete each table.
Explain how the Output number is related to the Input number.

a)

Input n	Output $n + 5$
1	
2	
3	
4	
5	

_____

_____

b)

Input b	Output $8 - b$
1	
2	
3	
4	
5	

_____

_____

c)

Input a	Output $6 + a$
1	
2	
3	
4	
5	

_____

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3. Complete each table.

a)

Input d	Output $2d + 3$
1	
2	
3	
4	
5	

b)

Input f	Output $3f - 2$
1	
2	
3	
4	
5	

c)

Input h	Output $5h + 1$
1	
2	
3	
4	
5	

4. Use algebra. Write a relation for each table.

a)

Input n	Output
1	2
2	3
3	4
4	5
5	6

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b)

Input p	Output
1	0
2	1
3	2
4	3
5	4

_____

c)

Input m	Output
1	8
2	16
3	24
4	32
5	40

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5. Use algebra. Write a relation for each table.
Then extend each table 3 more rows.

a)

Input r	Output
1	4
2	6
3	8
4	10
5	12

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b)

Input s	Output
1	2
2	5
3	8
4	11
5	14

_____

c)

Input n	Output
1	9
2	14
3	19
4	24
5	29

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