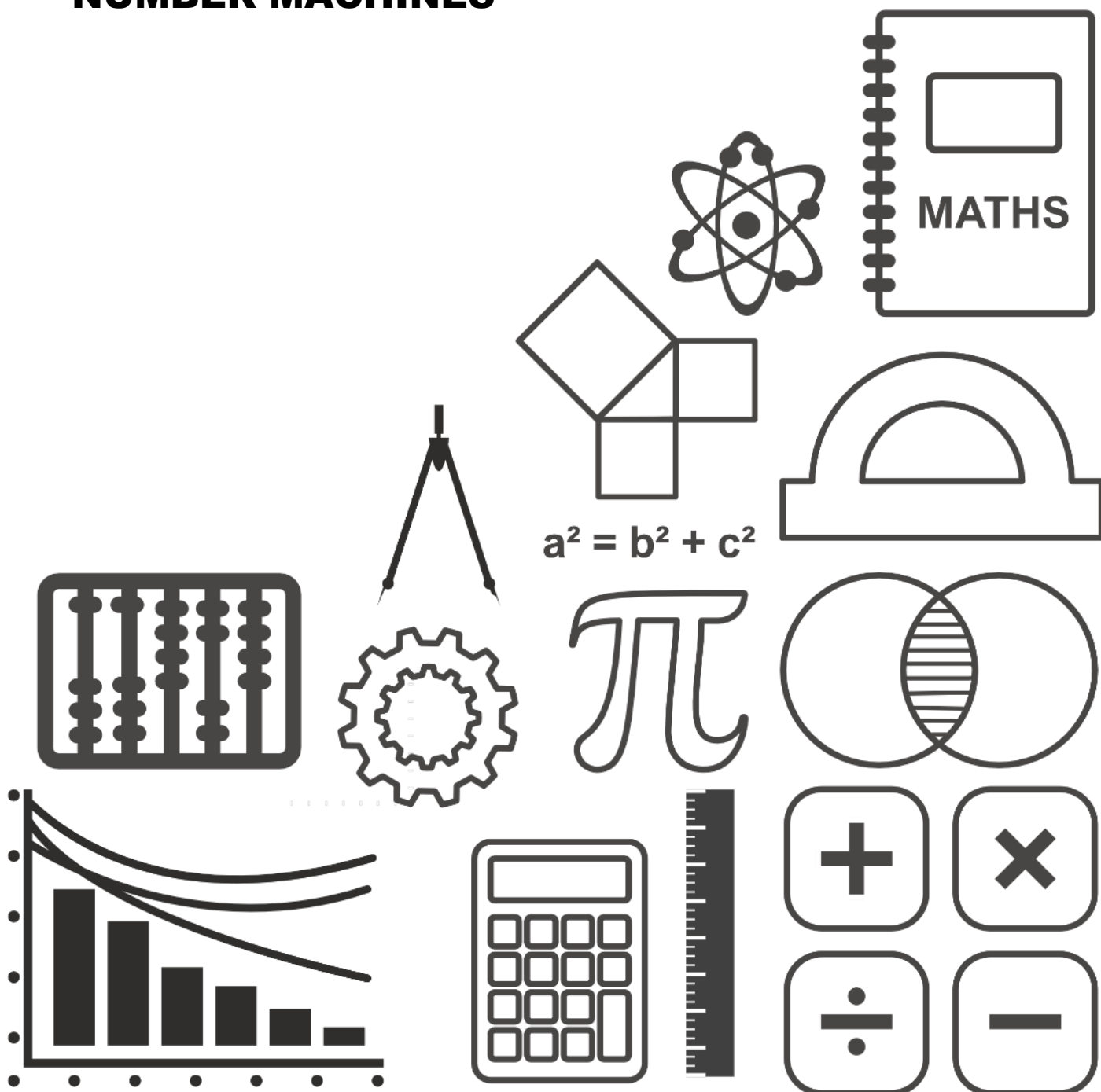


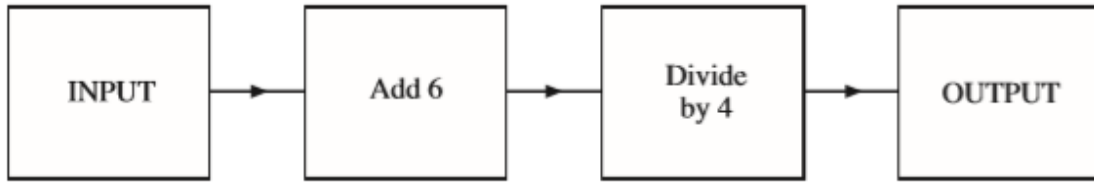
MATHSDIY

GCSE TOPIC BOOKLET NUMBER MACHINES



1.

(a) The diagram below represents a number machine.



(i) When the INPUT is 14, what is the OUTPUT?

.....

(ii) When the OUTPUT is 7, what is the INPUT?

.....

.....

[3]

2.

(a) The diagram below represents a number machine.



(i) When the INPUT is 8, what is the OUTPUT?

.....

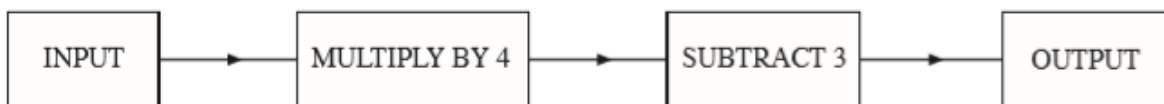
(ii) When the OUTPUT is 17, what is the INPUT?

.....

.....

[3]

3.

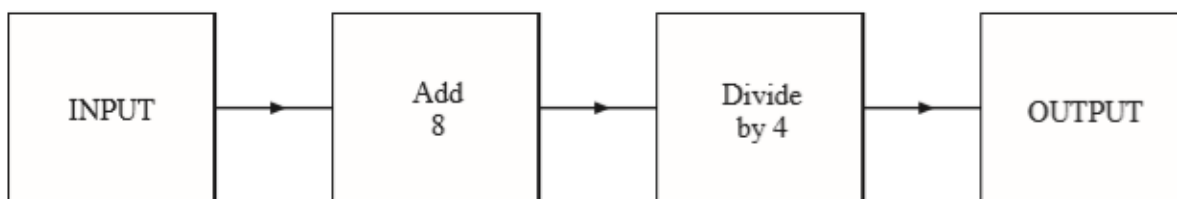


Numbers are INPUT into the above number machine.
What is the INPUT when the OUTPUT is 33?

.....

[2]

4.



(i) Find the value of the OUTPUT when the INPUT is 12.

.....

[1]

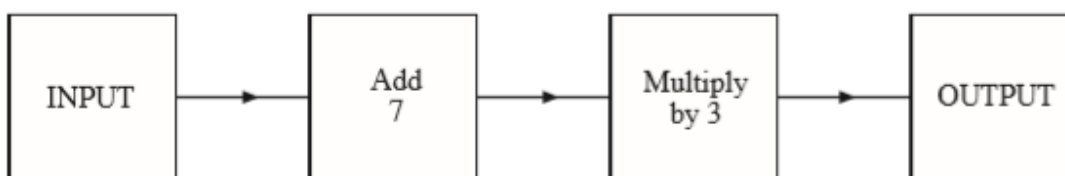
(ii) Find the value of the INPUT when the OUTPUT is 10.

.....

[2]

5.

The diagram below represents a number machine.



Find the OUTPUT when

- | | |
|--------------------------|----------------|
| (i) the INPUT is 5, | OUTPUT = |
| (ii) the INPUT is -9, | OUTPUT = |
| (iii) the INPUT is n . | OUTPUT = |

[4]



Write down the OUTPUT when n is INPUT into the number machine.

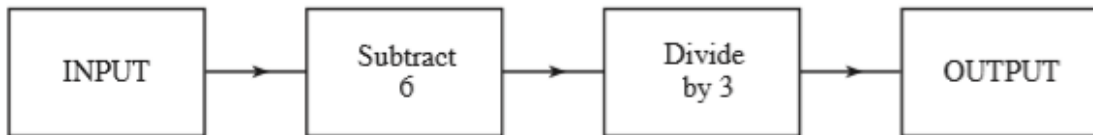
.....

.....

[2]

7.

The diagram below represents a number machine.



(a) When the INPUT is 18, what is the OUTPUT?

.....

[1]

(b) If the INPUT is x , write down the OUTPUT in terms of x .

.....

.....

[2]

(c) If the OUTPUT is y , write down the INPUT in terms of y .

.....

.....

[2]

8. Triangle patterns are made using sticks.

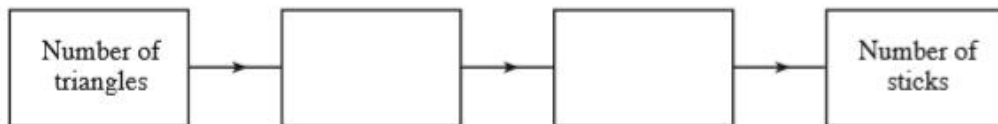


(a) Complete the following table which shows the relationship between the number of triangles in a pattern and the number of sticks.

Number of triangles	Number of sticks
1	3
2	5
3	7
4	9
5
⋮	⋮
10

[1]

(b) Use your table to enter the two missing stages in the number machine which is used to calculate the number of sticks for a given number of triangles.



[2]

9. The diagram shows a number machine.



(i) Find the **Input** to the number machine when the **Output** is -18 .

..... [1]

(ii) Write down the **Output** from the number machine when the **Input** is n .

.....
 [2]

10. The diagram shows a number machine.



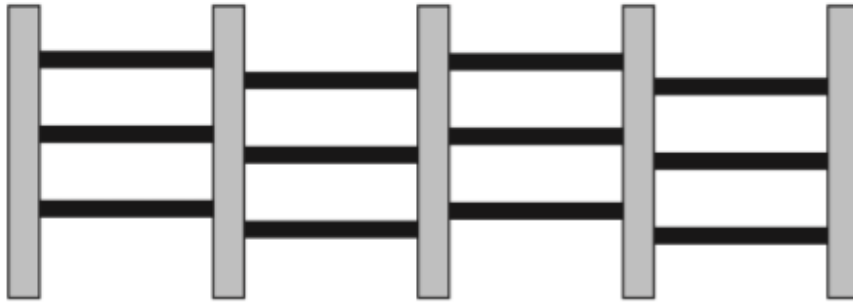
(i) Write down the **OUTPUT** when x is **INPUT** into the number machine.

..... [1]

(ii) Find the **INPUT** when y is the **OUTPUT** from the number machine.

..... [1]

11. Fences are made using vertical posts and 3 horizontal rails between each pair of vertical posts. The fence shown below has 5 vertical posts with 3 horizontal rails between each pair of vertical posts.

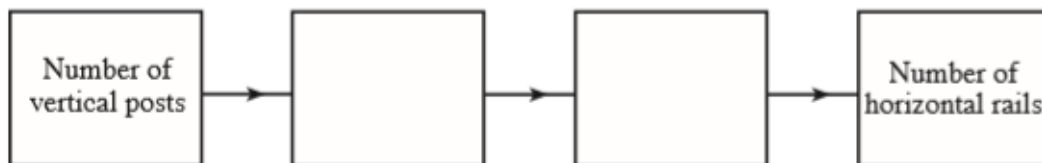


- (a) Complete the following table which shows the relationship between the number of vertical posts and horizontal rails.

Number of vertical posts	Number of horizontal rails
2	3
3	6
4	9
5	12
6	
10	

[1]

- (b) Use your table to enter the two missing stages in the number machine.



[2]