Aberdare Community School

Mathematics Department

WJEC GCSE

Foundation – Non Calculator

Algebra

Number machines

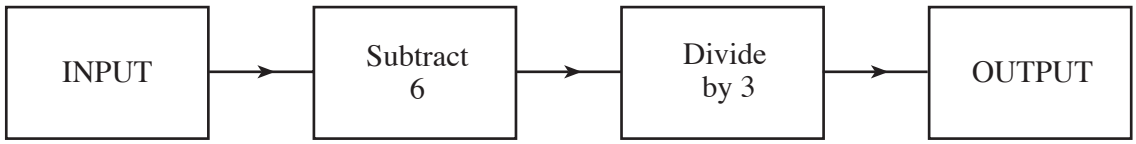
Name: .....

Set: .....

Date: .....

Teacher: .....

10. 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]

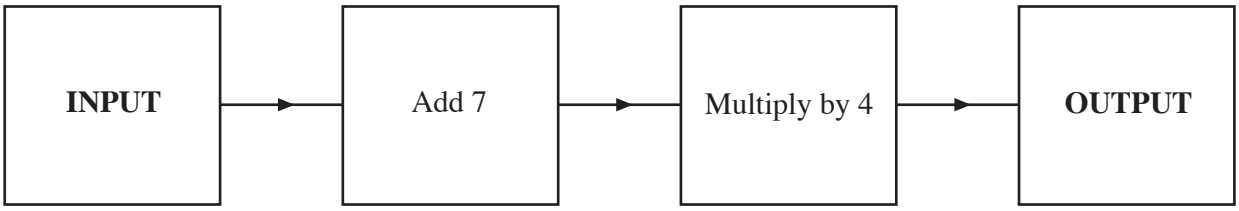
(c) If the OUTPUT is y, write down the INPUT in terms of y.

.....

.....

[2]

(b)



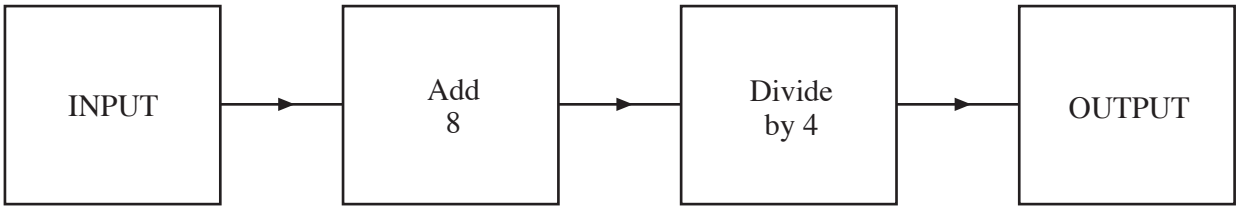
Write down the OUTPUT when n is INPUT into the number machine.

.....

.....

[2]

6. *(a)*



(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.

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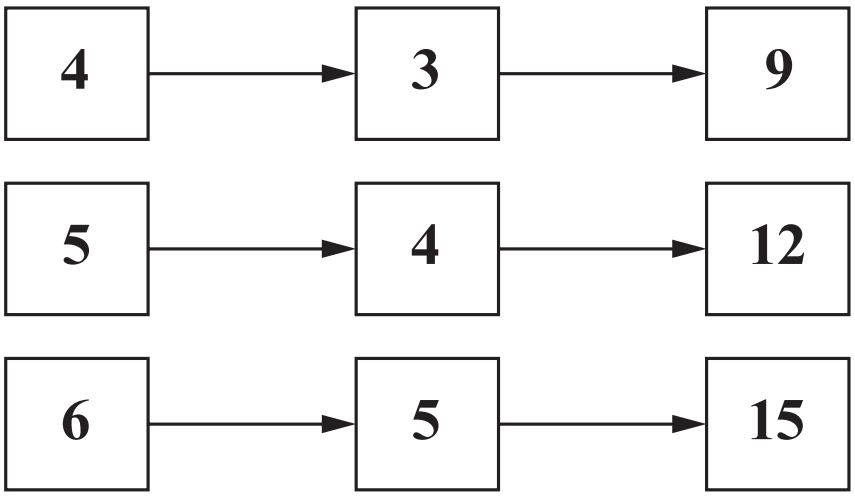
.....

[2]

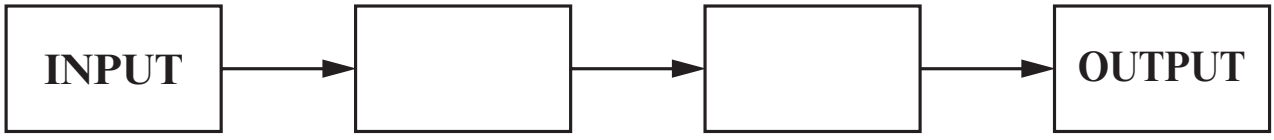
Examiner only

4.

(c) The following numbers have been produced using a number machine,



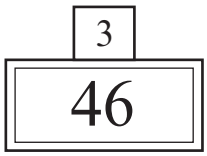
Complete the boxes for this number machine.



[1]

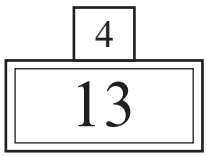
Examiner only

5. The diagram shows a counting machine.
The 46 is the starting number and the 3 is the stepping number.



When the machine is started, it would show 49, 52, 55, and so on.

(a) Write down the next 3 numbers shown when the following machine is started.



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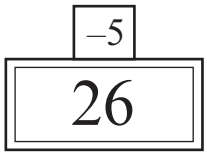
[1]

The machine can do negative steps.

(b) Write down the next 3 numbers shown when the following machine is started.

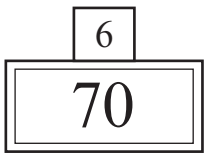


.....

[1]

Examiner only

(c) Explain how you can decide whether or not the following machine will show the number 134 at some time. (You should not attempt to write down all the values the machine will show.)



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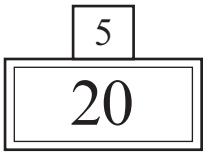
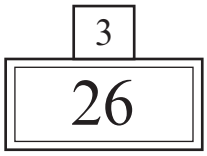
[2]

(d) The following two machines are started at the same time.





After how many steps will they show the same number and what is that number?

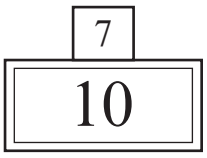
.....

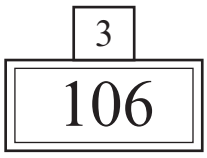
.....

.....

[2]

(e) Explain how you can decide whether or not the following two machines will show the same number at some time. (You should not attempt to write down all the values the machines will show.)





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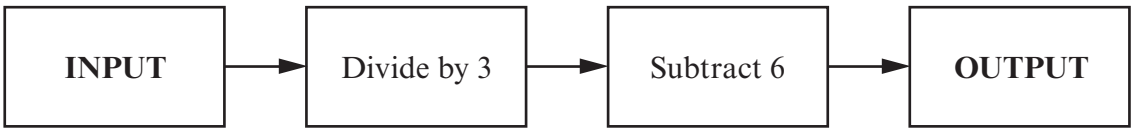
[2]

Examiner only

7.

(c) For the number machine below,



find the value of the **OUTPUT** when the **INPUT** is 21.

.....

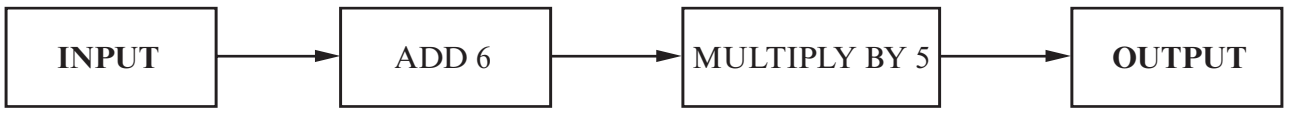
.....

[1]

Examiner only

5.

(c) Here is a number machine.



Write down the **OUTPUT** when the **INPUT** is n.

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.....

.....

.....

[2]

Examiner only

7.

(d) Here is a number machine.

Write down the **OUTPUT** when the **INPUT** is n.

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.....

.....

.....

[2]

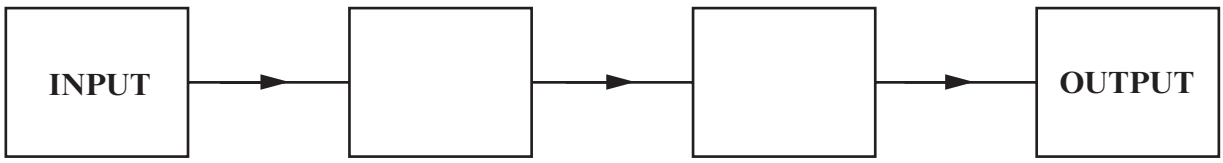
Examiner only

5.

(c) The following numbers have been produced using a number machine.

$$2 \longrightarrow 8 \longrightarrow 7$$
$$5 \longrightarrow 20 \longrightarrow 19$$
$$10 \longrightarrow 40 \longrightarrow 39$$

Complete the boxes for the number machine.

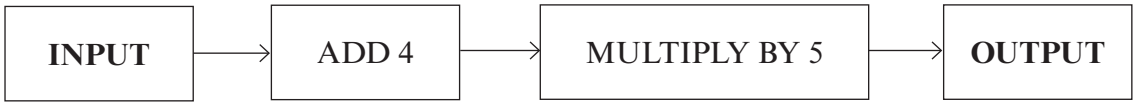


[1]

Examiner only

8.

(c) Here is a number machine.



Write down the OUTPUT when the INPUT is n.

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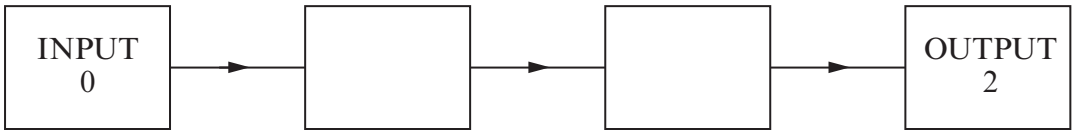
.....

[2]

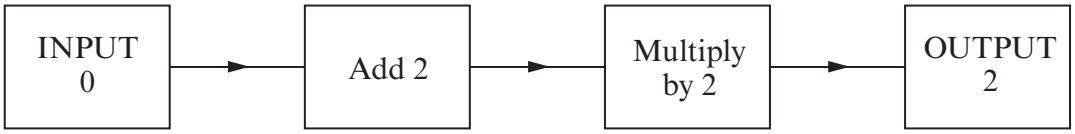
Examiner only

5.

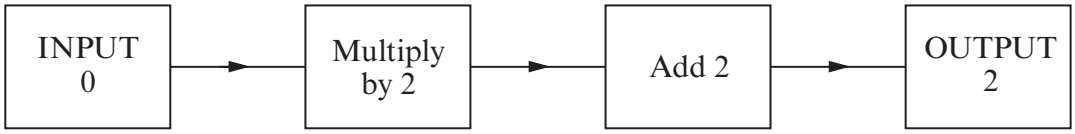
(c) Jenny and Steve were asked to find a rule for the following function machine.



Jenny wrote the rule as



Steve wrote the rule as



Showing all the working for both rules, explain who is correct.

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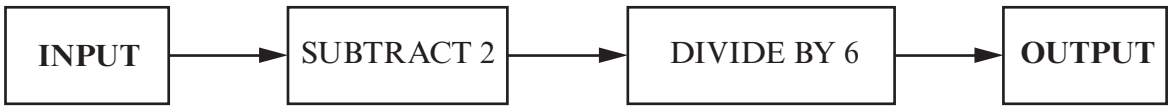
[2]

Examiner only

(e) Here is a number machine.



Write down the OUTPUT when the INPUT is –4.

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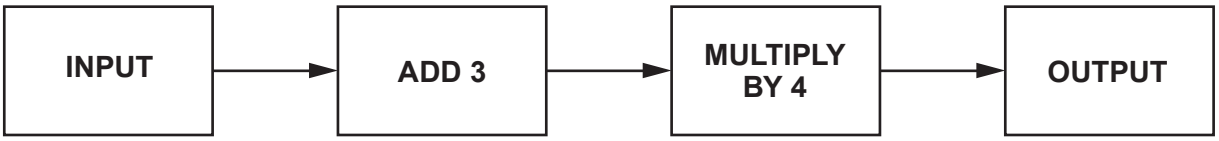
.....

[1]

Examiner only

(b) The diagram below shows a number machine.



Using the number machine, calculate

(i) the **OUTPUT** when the **INPUT** is 9, [1]

.....

(ii) the **OUTPUT** when the **INPUT** is –1, [1]

.....

(iii) the **INPUT** when the **OUTPUT** is 28. [1]

.....

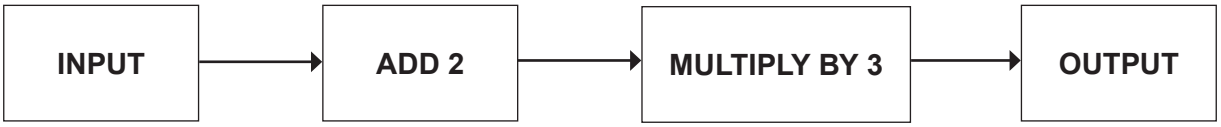
4363 010007

Turn over.

Examiner only

3.

(b) Here is a number machine.



Write down the **OUTPUT** when the **INPUT** is –7. [1]

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.....

4352 010005