Q1.

Here are two number machines, **A** and **B**.

Input   Output

A ( ) → $\times 7$ → -4 → ( )

B ( ) → $\times 3$ → $+2$ → ( )
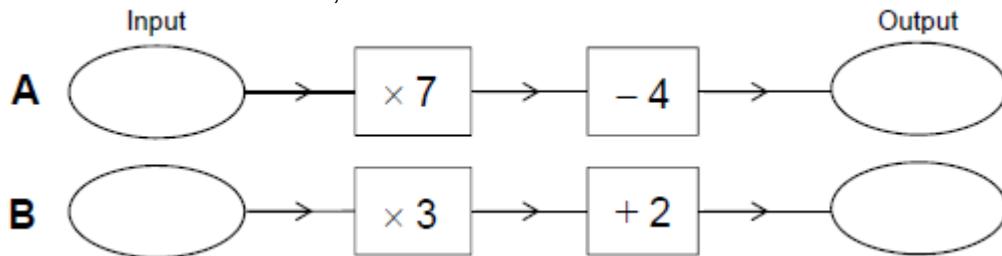
Both machines have the same input.

Work out the input that makes

the output of **A** three times the output of **B**.

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Answer ....

(Total 4 marks)

Q2.

Here are two number machines.

Input   Output

( ) → $\times 5$ → -2 → ( )

Input   Output

( ) → -2 → $\times 5$ → ( )
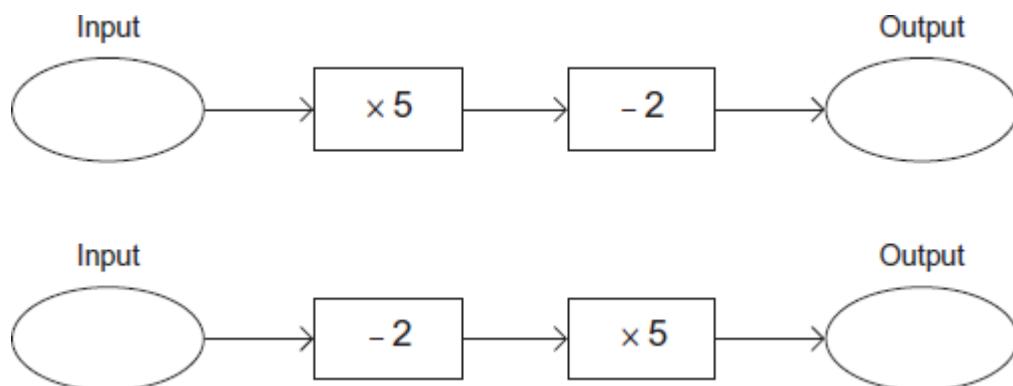
When the inputs are equal,

show that the **difference** between the outputs is always 8

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(Total 3 marks)

Q3.(a)   Work out $(6.45 \times 10^6) \times (2.5 \times 10^{-4})$

Write your answer in standard form.

Answer ....

(2)

(b)   Here is a number machine.
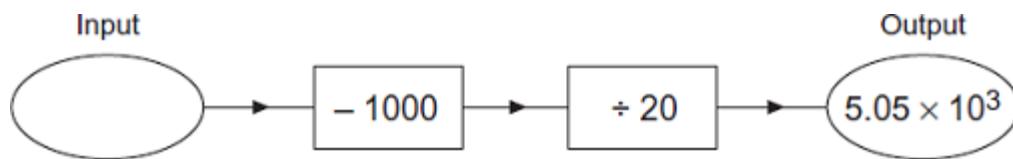
Input   Output

Work out the **input** when the output is 5.05×10^3

Write your answer in standard form.

Answer ....

(3)
(Total 5 marks)

Q4.

(a)   Here is a number machine.
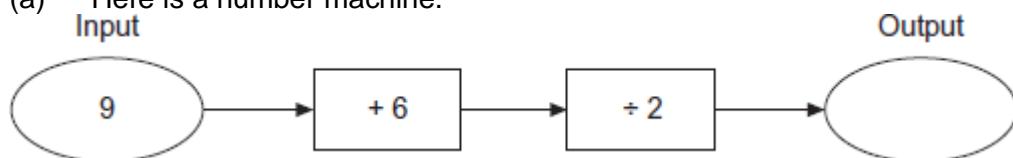
Input   Output

9 → $+6$ → $\div 2$ →

Work out the output when the input is 9.

Answer ....

(1)

(b)   Here is the same number machine.

Input   Output

→ $+6$ → $\div 2$ → 9
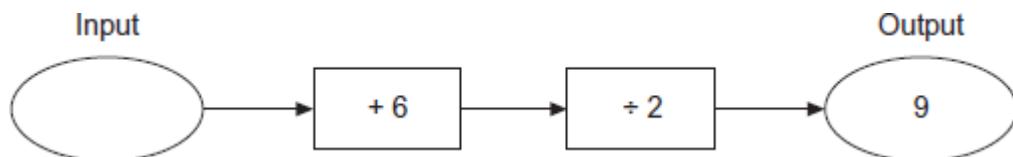
Work out the input when the output is 9.

Answer ....

(1)
(Total 2 marks)

Q5.

(a)   Here is a number machine.
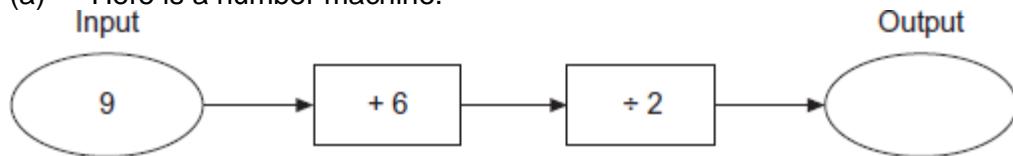
Input   Output

9 → $+6$ → $\div 2$ →

Work out the output when the input is 9.

Answer ....

(1)

(b)   Here is the same number machine.

Input   Output

$+6$ $\div 2$ 9
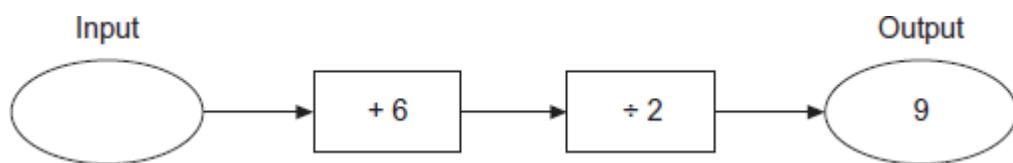
Work out the input when the output is 9.

Answer ....

(1)

(c)   Here is a different number machine.

Input   Output

9     $\times$ ...... $-$ 9
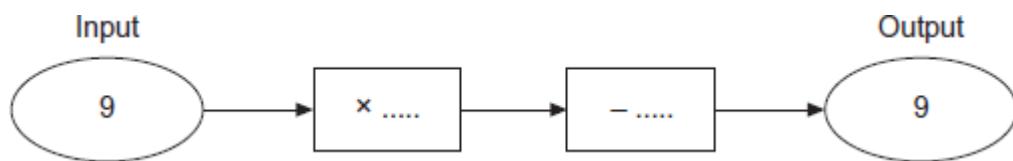
Complete possible operations for this number machine.

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(1)
(Total 3 marks)

Q6. Here is a number machine.

Input   Output

multiply by 4   subtract 8
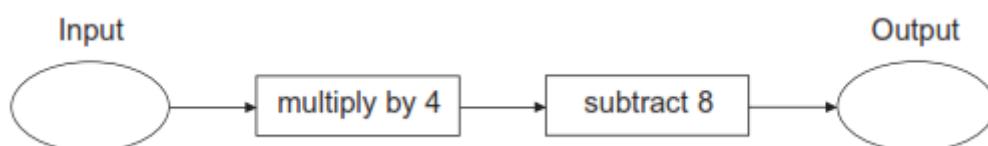
When the input is a the output is b.

When the input is b the output is c.

Show clearly that $c = 8(2a - 5)$

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(Total 4 marks)

Q7.(a)   Solve $a + 5 = 9$

$a =$ ....

(1)

(b)   Simplify fully $4x + 5y + 2x + 3y$

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Answer ....

(2)

(c)   Work out the value of $5f - 4g$ when $f = 3$ and $g = 2$

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Answer ....

(2)
(Total 5 marks)

Q8. Here is a number machine.
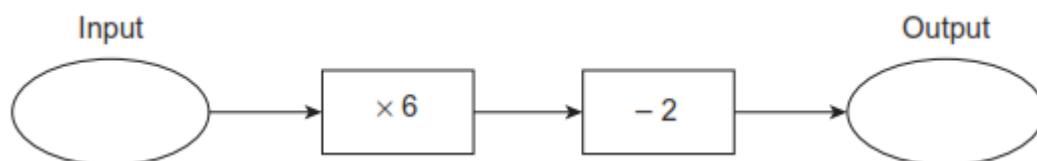
The output is twice the input.

Work out the input.

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Answer ....

(Total 3 marks)

Q9. The rule for finding the next term in a sequence is

Subtract 4 and then multiply by 4

The second term is 12.

The third term is 52.

....   12   52   ....

Work out the first term of the sequence.

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Answer ....

(Total 4 marks)