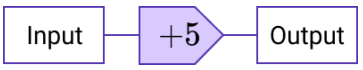
Function Machines - Worksheet

Skill

Group A - Finding outputs from function machines

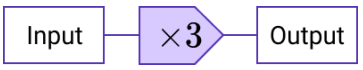
Work out the outputs for the function machines with the given inputs.

1)



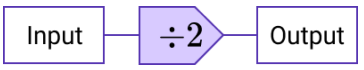
a. 3
b. 7

2)



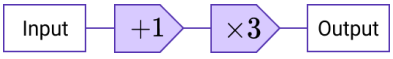
a. 4
b. 6

3)



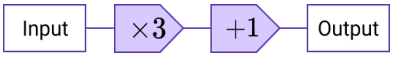
a. 10
b. 5

4)



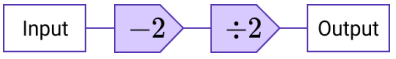
a. 2
b. 5

5)



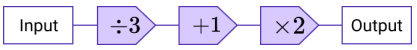
a. 2
b. 5

6)



a. 6
b. 9

7)

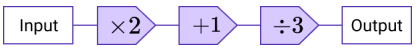


a. 12
b. 21

8)

a. 5
b. 14

9)

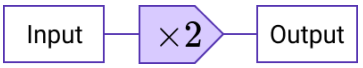


a. 10
b. 7

Group B - Finding inputs from function machines

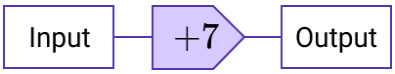
Use inverse operations to work out the inputs from the given outputs of the function machines.

1)



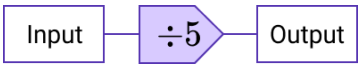
a. 8
b. 5

2)



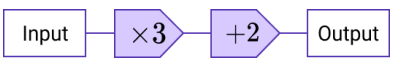
a. 15
b. 6

3)



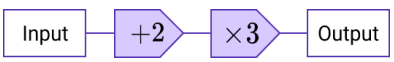
a. 3
b. 7

4)



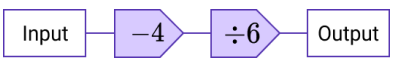
a. 11
b. 17

5)



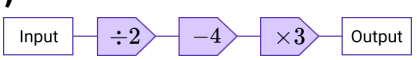
a. 21
b. 36

6)



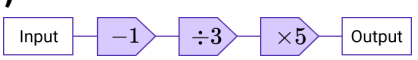
a. 3
b. 1

7)



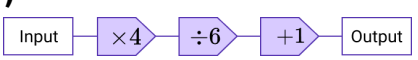
a. 9
b. 18

8)



a. 25
b. 35

9)



a. 5
b. 7

Function Machines - Worksheet

Group C - Solving equations using function machines

Draw a function machine to represent the equation and use it to solve the equation.

1) $x + 5 = 12$

2) $3x = 15$

3) $\frac{x}{7} = 2$

4) $2x + 1 = 17$

5) $3x - 4 = 14$

6) $2(x + 3) = 24$

7) $\frac{x}{3} + 1 = 4$

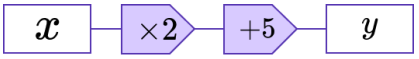
8) $\frac{x}{6} - 3 = 2$

9) $\frac{x+7}{2} = 6$

Function Machines - Worksheet

Applied

1) Jen wanted to use a function machine to help her find coordinates on a straight line graph.

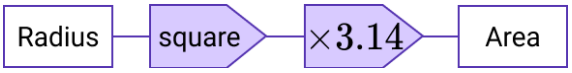


x	y
1	
3	
	15

(a) Complete the table of values.

(b) Is the point $(9, 22)$ on Jen's straight line?

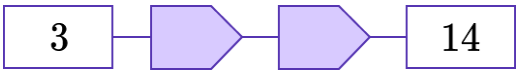
2) **(a)** Neil made a function machine to find the area of a circle? Find the area of a circle with radius $5cm$.



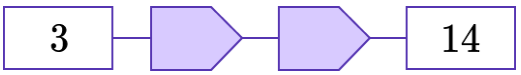
(b) Use inverse operations to find the radius of a circle with an area of $12.56cm^2$.

3) Give two possible function machines that could produce an output of 14 with an input of 3.

(a)

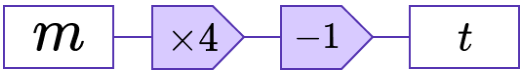


(b)



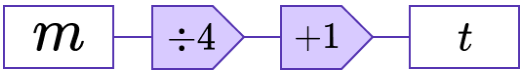
Function Machines - Worksheet

4) Function machines can be used to describe and rearrange some formulae. Eg:



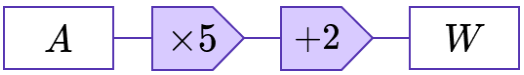
Give the formula $t = 4m - 1$.

The inverse function machine



Gives the formula $m = \frac{t+1}{4}$.

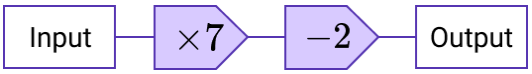
(a) Write the formula for W, in terms of A, described by the function machine.



(b) Use the inverse function machine to write a formula for A in terms of W.

Function Machines - Exam Questions

1) Here is a function machine:



(a) What is the output when the input is 6? ..... **(1)**

(b) What is the input when the output is 26? ..... **(1)**

(2 marks)

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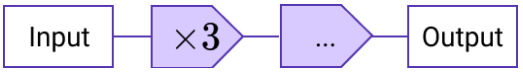
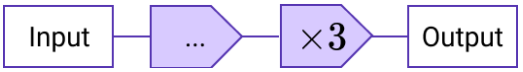
2) **(a)** The output of this function machine is 25 when the input is 9. Fill in the missing operation. ..... **(2)**



(b) The output of this function machine is 12 when the input is 5. Fill in the missing operation. ..... **(2)**



(4 marks)

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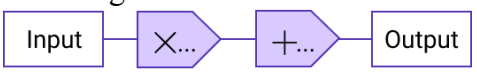
3) Fill in the missing values for the function machine. ..... **(2 marks)**



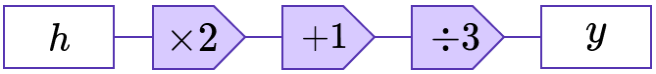
$3 \longrightarrow 13$

$5 \longrightarrow 17$

$11 \longrightarrow 28$

---

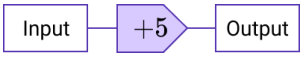
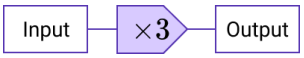
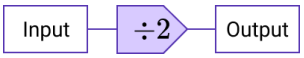
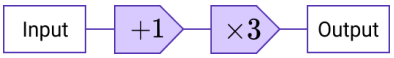
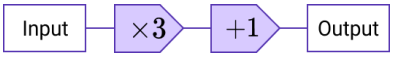
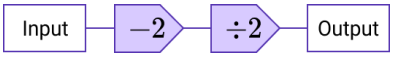
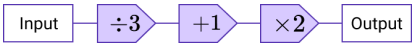
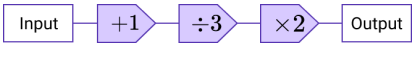
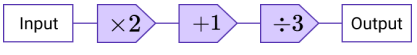
4) **(a)** Use the function machine to write a formula for y in terms of h. ..... **(3)**



(b) Use inverse operations to write a formula for h in terms of y. ..... **(3)**

(6 marks)

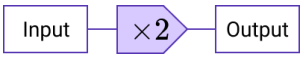
Function Machines - Answers

	Question	Answer
	Skill Questions	
Group A	Work out the outputs for the function machines with the given inputs. **1)**  a. 3 b. 7 **2)**  a. 4 b. 6 **3)**  a. 10 b. 5 **4)**  a. 2 b. 5 **5)**  a. 2 b. 5 **6)**  a. 6 b. 9 **7)**  a. 12 b. 21 **8)**  a. 5 b. 14 **9)**  a. 10 b. 7	**1)** a. 8 b. 12 **2)** a. 12 b. 18 **3)** a. 5 b. 2. 5 **4)** a. 9 b. 18 **5)** a. 7 b. 16 **6)** a. 2 b. 3. 5 **7)** a. 10 b. 16 **8)** a. 4 b. 10 **9)** a. 7 b. 5

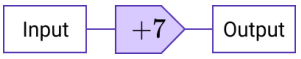
Function Machines - Answers

Group B

Use inverse operations to work out the inputs from the given outputs of the function machines.

1) 

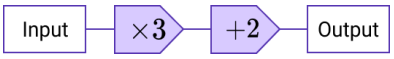
b. 8 b. 5

2) 

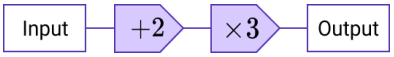
b. 15 b. 6

3) 

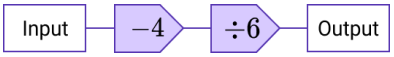
b. 3 b. 7

4) 

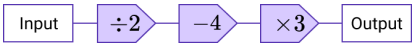
b. 11 b. 17

5) 

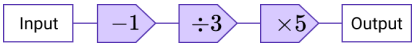
b. 21 b. 36

6) 

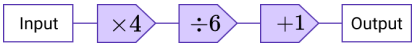
b. 3 b. 1

7) 

b. 9 b. 18

8) 

b. 25 b. 35

9) 

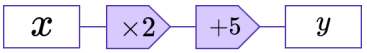
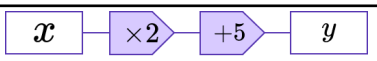
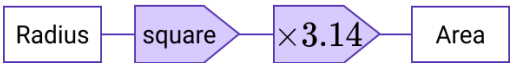
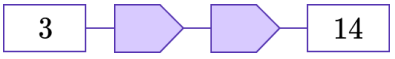
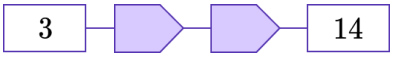
b. 5 b. 7

1) a. 4 b. 2.5
2) a. 8 b. − 1
3) a. 15 b. 35
4) a. 3 b. 5
5) a. 5 b. 10
6) a. 22 b. 10
7) a. 14 b. 20
8) a. 16 b. 22
9) a. 6 b. 9

Function Machines - Answers

Group C	Draw a function machine to represent the equation and use it to solve the equation. **1)** $x + 5 = 12$ **2)** $3x = 15$ **3)** $\frac{x}{7} = 2$ **4)** $2x + 1 = 17$ **5)** $3x - 4 = 14$ **6)** $2(x + 3) = 24$ **7)** $\frac{x}{3} + 1 = 4$ **8)** $\frac{x}{6} - 3 = 2$ **9)** $\frac{x+7}{2} = 6$	**1)** $x \rightarrow +5 \rightarrow 12$ $x = 7$ **2)** $x \rightarrow \times 3 \rightarrow 15$ $x = 5$ **3)** $x \rightarrow \div 7 \rightarrow 2$ $x = 14$ **4)** Input $\rightarrow \times 2 \rightarrow +1 \rightarrow 17$ $x = 8$ **5)** Input $\rightarrow \times 3 \rightarrow -4 \rightarrow 14$ $x = 6$ **6)** Input $\rightarrow +3 \rightarrow \times 2 \rightarrow 24$ $x = 9$ **7)** Input $\rightarrow \div 3 \rightarrow +1 \rightarrow 4$ $x = 9$ **8)** Input $\rightarrow \div 4 \rightarrow -3 \rightarrow 2$ $x = 30$ **9)** Input $\rightarrow +7 \rightarrow \div 2 \rightarrow 6$ $x = 5$

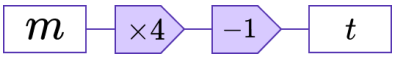
Function Machines - Answers

	Question	Answer
	Applied Questions	
1)	Jen wanted to use a function machine to help her find coordinates on a straight line graph.  x | y 1 | 3 | | 15 **(a)** Complete the table of values. **(b)** Is the point $(9, 22)$ on Jen's straight line?	**(a)**  x | y 1 | 7 3 | 11 5 | 15 **(b)** No, $9 \times 2 + 5 = 23$ not 22
2)	**(a)** Neil made a function machine to find the area of a circle? Find the area of a circle with radius $5cm$.  **(b)** Use inverse operations to find the radius of a circle with an area of $12.56cm^2$.	**(a)** $78.5cm^2$ **(b)** $2cm$
3)	Give two possible function machines that could produce an output of 14 with an input of 3. **(a)**  **(b)**  	**(a)** E.g. $\times 3 + 5, -1 \times 7, \times 4 + 2$ **(b)** E.g. $\times 3 + 5$, -1×7, $\times 4 + 2$ Different from part a

Function Machines - Answers

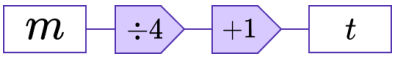
4)

Function machines can be used to describe and rearrange some formulae. Eg:



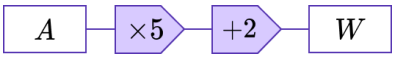
Give the formula $t = 4m - 1$.

The inverse function machine



Gives the formula $m = \frac{t+1}{4}$.

(a) Write the formula for W, in terms of A, described by the function machine.

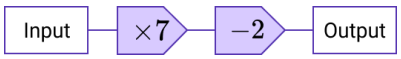
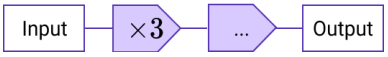
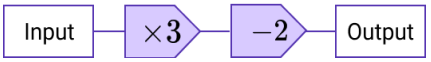
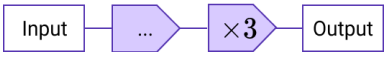
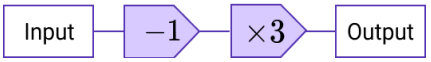
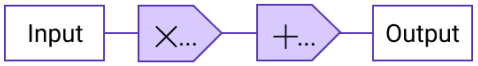


(a) $W = 5A + 2$

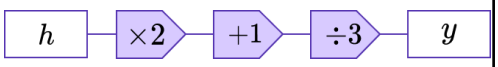
(b) Use the inverse function machine to write a formula for A in terms of W.

(b) $A = \frac{W-2}{5}$

Function Machines - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	Here is a function machine: 		
(a)	What is the output when the input is 6?	**(a)** 40	**(1)**
(b)	What is the input when the output is 26?	**(b)** 4	**(1)**
2) (a)	The output of this function machine is 25 when the input is 9. Fill in the missing operation. 	**(a)** $9 \times 3 = 27$ Answer of − 2 	**(2)**
(b)	The output of this function machine is 12 when the input is 5. Fill in the missing operation. 	**(b)** $12 \div 3 = 4$ Answer of − 1 	**(2)**
3)	Fill in the missing values for the function machine.  3 ⟶ 13 5 ⟶ 17 11 ⟶ 28	First box 2 Second box 7	**(2)**

Function Machines - Mark Scheme

4) (a)	Use the function machine to write a formula for y in terms of h. 	**(a)** $2h$ $2h + 1$ $y = \frac{2h+1}{3}$	**(3)**
(b)	Use inverse operations to write a formula for h in terms of y.	**(b)** $3y$ $3y - 1$ $h = \frac{3y-1}{2}$	**(3)**