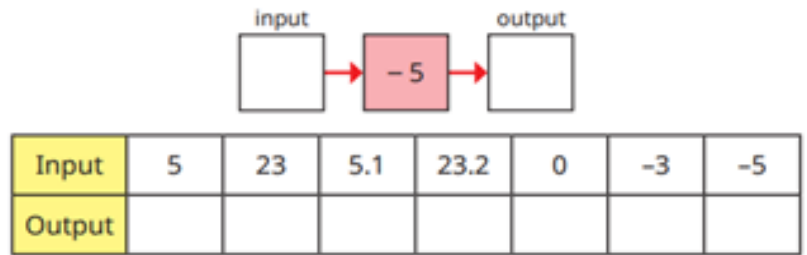
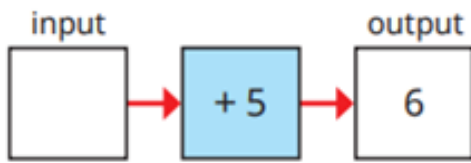


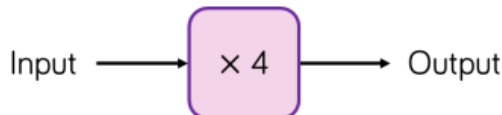


Monday 5.2.24

MPI: Using one-step functions

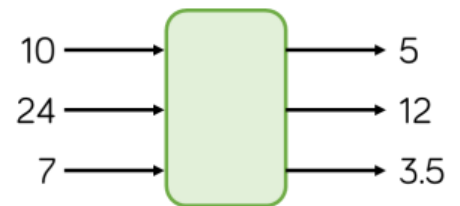


Here is a function machine.



- What is the output if the input is 2?
- What is the output if the input is 7.2?
- What is the input if the output was 20?
- What is the input if the output was 22?

Find the missing function.



Complete the table for the function machine.



Input	5	5.8	10	-3	-8			
Output						9	169	0

Circle the function being used here.

6.5	?	-10.5
9		-3
13		6
$a - 17$	$a - 30$	$3a - 30$

Jo and Ron are working out the rule for the function machine.



The rule is + 40



The rule is × 11

Who do you agree with?  
Explain your answer.

Tiny is working out the missing number.

Input	9	7	3.5	-2
Output	19	17	13.5	

The missing number is -12

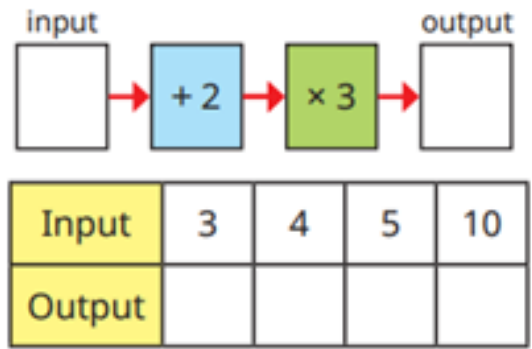
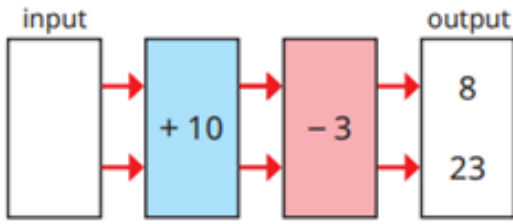


Explain Tiny's mistake.  
What is the missing number?



Tuesday 6.2.24

### MPI: Using two-step functions



Here is a function machine.



- What is the output if the input is 5?
- What is the input if the output is 19?
- What is the output if the input is 3.5?

How can you write this two-step machine as a one-step machine?



Check your answer by inputting values.

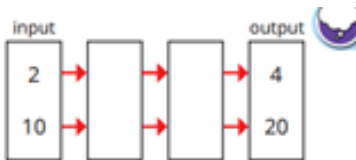
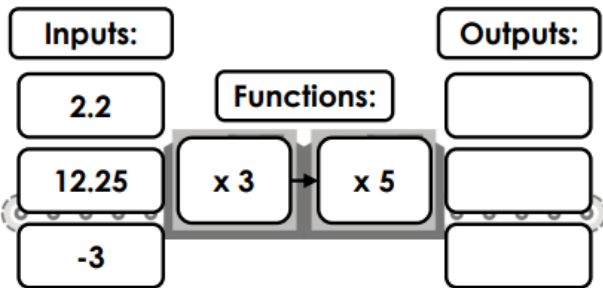
Tiny is using a 2-step function machine.



You can multiply numbers in any order, and you can add numbers in any order. This means you can solve this function machine in any order.



Do you agree with Tiny?  
Explain your answer.



The missing functions are  $\times 4$  and  $\div 2$

Kim

The missing functions are  $\times 2$  and  $\times 1$



Teddy



There only needs to be one function, which is  $\times 2$

Whitney

Who do you agree with?

What other functions would work?



Complete the table for the given function machine.



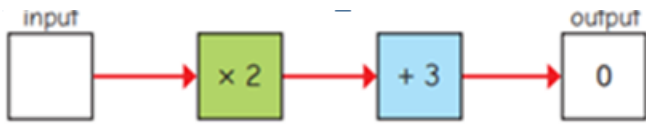
Input	1	2	3	4	5
Output					

- What patterns do you notice in the outputs?
- What is the input if 20 is the output? How did you work it out?



Wednesday 7.2.24

### MPI: Expressing missing numbers algebraically



$c$  and  $d$  represent positive integer variables.

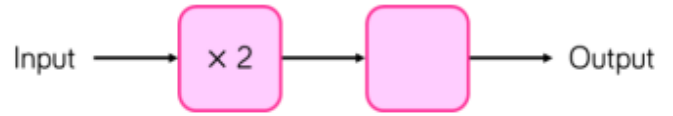
$$c + d = 5$$

Complete the table to show possible values of  $c$  and  $d$ .

$c$	$d$

This function machine gives the same output for every input.

For example if the input is 5 then the output is 5 and so on.



What is the missing part of the function?

What other pairs of functions can you think that will do the same?

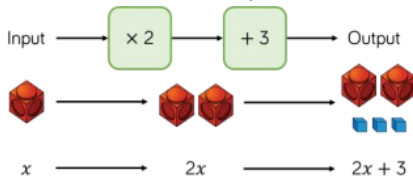
What is the same and what is different about these equations?

$4x + 5 = 13$

$4x - 5 = 15$

$8x - 5 = 35$

Eva is writing expressions for two-step function machines.



Use Eva's method to write expressions for the function machines.



Martin is  $x$  years old. Jennifer is 3 years younger than Martin. Connor is twice as old as Martin.

- Write an expression for Jennifer's age
- Write an expression for Connor's age.
- Write an expression for the sum of the three ages

Apples cost  $y$  pence each. Bananas cost  $y$  pence each. Write down an expression for the total cost, in pence, of 3 apples and 5 bananas.



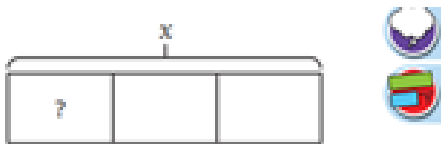
Thursday 8.2.24

### MPI: Substituting using simple expressions

Substitute the following to work out the values of the expressions.

$w = 3 \quad x = 5 \quad y = 2.5$

- $w + 10$
- $w + x$
- $y - w$



The bar model represents  $3x$  because  $x$  is the total and there are three parts.

Do you agree with Tiny?  
Explain your answer.



Match the expressions to their values.

If  $\blacklozenge = 0.5$  and  $\smile = 8$ .

- A.  $(\blacklozenge \times \smile) - \blacklozenge$  3.5
- B.  $\blacklozenge + \blacklozenge + \smile$  15.5
- C.  $\smile - \blacklozenge + \smile$  9

Match the expressions to their values.

If  $\star = \frac{1}{6}$  and  $\blacktriangle = 2.7$ .

- A.  $(12\star + 2\blacktriangle) - \blacktriangle$  4.7
- B.  $(6\star + 10\blacktriangle) + \blacktriangle$  33.7
- C.  $24\star + 10\blacktriangle + \blacktriangle$  29.7

Substitute the following to work out the values of the expressions.

$w = 10 \quad x = \frac{1}{4} \quad y = 2.5$

- $3y$
- $wx$
- $12 + 8.8w$
- $wy + 4x$

The perimeter of a rectangle is  $12x$ .

What could the sides of the rectangle be?

Tick the substitution used for this expression if the value is 93.

$4q - r$

$q = 25, r = 7$

$q = 30, r = 25$

True or false?

If  $c = \frac{1}{12}$ ,  $d = 100$  and  $e = 7.9$ .

$(12c \div d) + e = 7.91$

Who is correct?

$a = 0.2, b = 25$  and  $c = 10$



Will

$5a \times (3b - c)$   
is  $2 \times 15 = 30$



Lucy

$5a \times (3b - c)$   
is  $1 \times 65 = 65$



Friday 9.2.24

MPI: Using formula

Which of the following is a formula?

$P = 2l + 2w$

$3d + 5$

$20 = 3x - 2$

Explain why the other two are not formulae.

In your own way, show the distinction between an equation and a formula.

This is the formula to work out the cost of a taxi.

$C = 1.50 + 0.3m$

$C$  = the cost of the journey in £

$m$  = number of miles travelled.

Work out the cost of a 12-mile taxi journey

The rule for making scones is use 4 times as much flour ( $f$ ) as butter ( $b$ ).

Which is the correct formula to represent this?

(A)

$f = \frac{b}{4}$

(B)

$f = 4b$

(C)

$f = b + 4$

(D)

$4f = b$

Explain why the others are incorrect.

Jack and Dora are using the following formula to work out what they should charge for four hours of cleaning.

Cost in pounds =  $20 + 10 \times$  number of hours

Jack thinks they should charge £60

Dora thinks they should charge £120

Who do you agree with?

Why?

Link each statement with a formula in the table below:

Statement	Formula
Total cost (in £C) for a show that costs £5 per ticket (n).	$C = \frac{100}{n}$
Cost (in £C) per person (n) of a bouncy castle that is £100 to hire.	$C = 500 - n$
Final cost (in £C) of a £500 television with £n cash back.	$C = 5n$
Total cost (in £C) of a job by a plumber who charges £30 per hour (n) plus a £20 call out fee.	$C = 30n + 20$