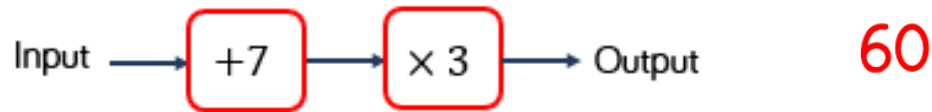1) Write an equation for the word problem.

"I think of a number, add 4, the answer is 9"

$$x + 4 = 9$$
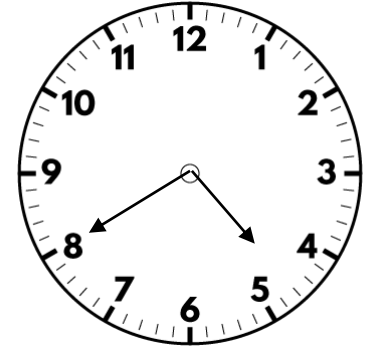
2) What is the output if the input is 13?

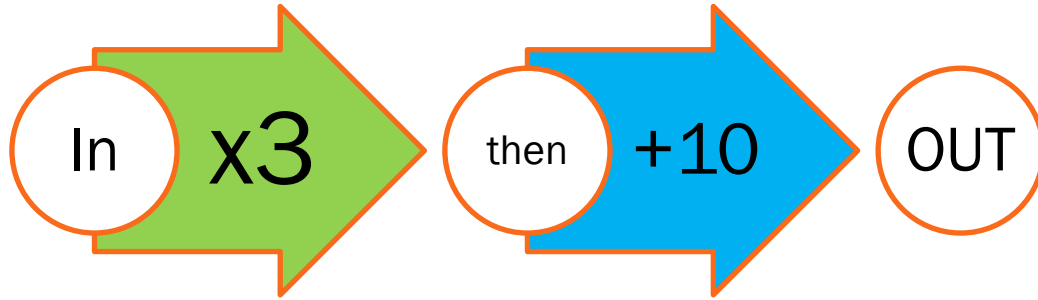Input ⟶ +7 ⟶ × 3 ⟶ Output   60

3) Write 0.7 as a fraction $\frac{7}{10}$

4) Find the area of a square with side lengths 16 cm

256 cm^2

RECALL

In → x3 → then → +10 → OUT

- Can you complete the table?

- Can you write these algebraically?

- What do you need to use in the formula for the second machine?

In → +10 → then → x3 → OUT
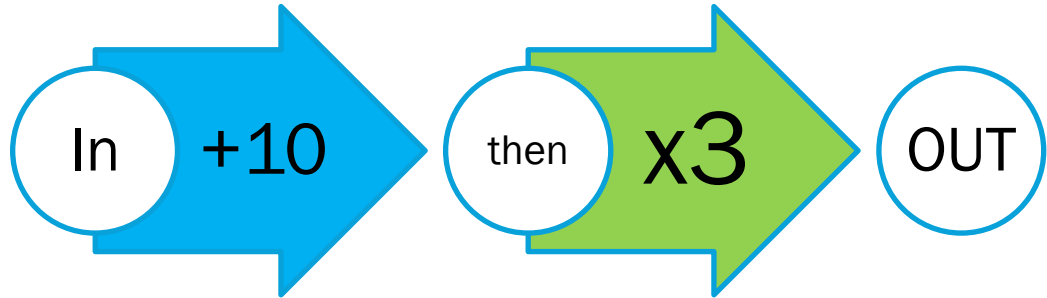
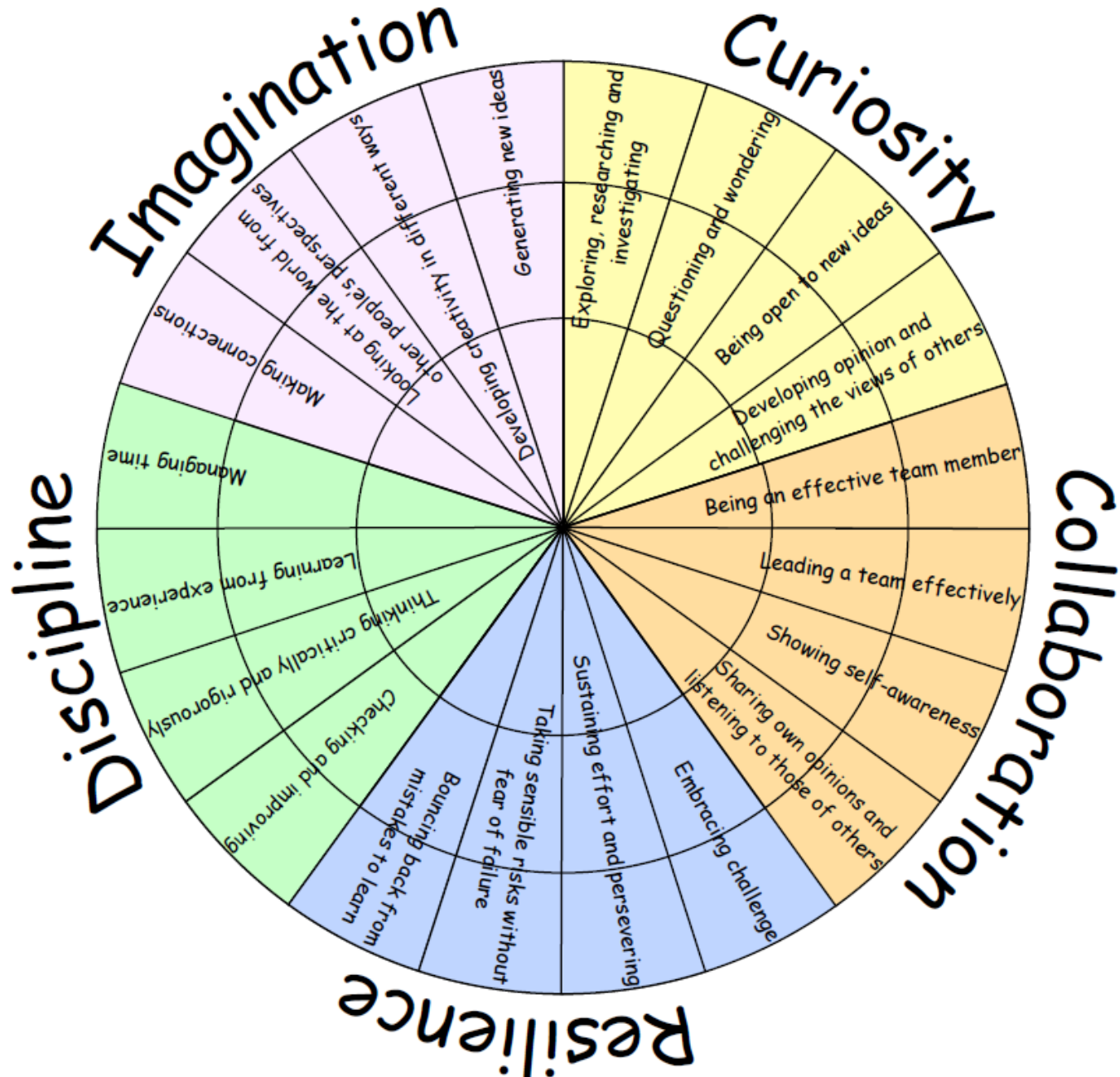| Input	1	2	3	4	5	10	20
Output							

I CAN SOLVE A VARIETY OF NUMBER PROBLEMS USING FORMULAE AND ALGEBRAIC EQUATIONS

PROBLEM SOLVING (19VIII) 3RD MARCH 2020

LEARNING HABITS?

GUIDED PRACTICE

When I get into a taxi, there is a £2.50 booking fee.
I am then charged 80p per mile.

1. How much will it cost me for a 5 mile trip?
2. Will it be double the cost of a 5 mile trip for a 10 mile trip?

When I get into a taxi, there is a £2.50 booking fee. I am then charged 80p per mile.

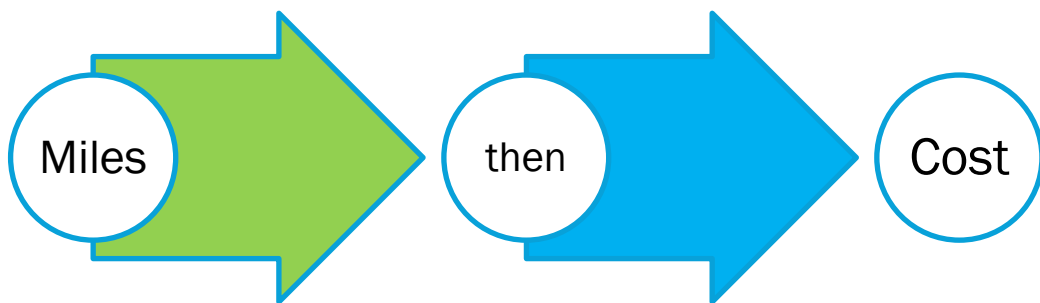| Miles	1	2	3	4	5	10
Cost						

Miles → then → Cost

GUIDED PRACTICE

1. How much will it cost me for a 5 mile trip?
2. Will it be double the cost of a 5 mile trip for a 10 mile trip?

How far can I travel if I have £20?

I charge £12 per hour to teach maths. I always charge £8 to cover my travel costs. Can you complete the table below?

Input → ×12 → +8 → Output

Hours	1	2	3	4	5	10
Cost						

An electrician charges a £7.50 callout fee. They then charge £25 for each hour worked. Complete the table to show the costs.

Input → ? → ? → Output

Hours	1	2	3	4	5	10
Cost						

When I sell cakes, I charge £1.25 for a bag to carry the cakes in. Each cake costs 70p. Complete the table:

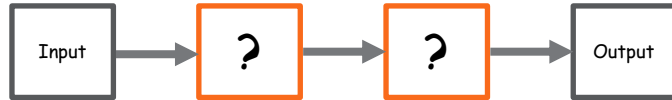Input → ? → ? → Output

Hours	1	2	3	4	5	10
Cost						

1) Joe and Nadia are using the following formula to work out what they should charge for 4 hours cleaning.

Cost = £20 + £10 x number of hours

Draw a function machine.

Input → ? → ? → Output

Joe thinks he should be paid £60.
Nadia thinks they should be paid £120.
Who do you agree with and why?

2) Maria bakes cakes and sells them in bags. She uses this formula to work out how much to charge.

Cost = number of cakes × 20p + 15p for the bag

Draw a function machine.

Input → ? → ? → Output

a) How much will 12 cakes cost?
b) Olivia buys a bag of cakes for
How many cakes does she have in the bag?

3) There is a £2.00 charge to turn the lights on at the squash court. It then costs 15p per minute.

Input → ? → ? → Output
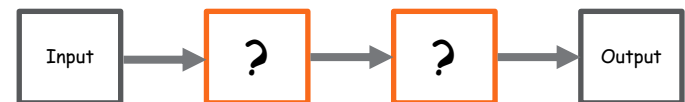
b) How much would a 30 minute game cost me?

4) I order some photos online. Each photo costs 55p.
There is a £1.50 delivery charge.

a) How much would 20 photos cost?
b) If I spent £7, how many photos did I buy?

5) A theme park sells tickets online. Each ticket costs £24. There is a £3 charge for buying tickets.
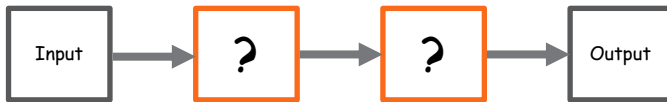
Input → ? → ? → Output

DIVE DEEPER 2

5) Sheila stacks blocks onto a base.
The base is 15cm tall.
Each block is 10cm tall.

Input → ? → ? → Output

a) Sheila uses 8 blocks.
How tall is the tower?

b) The tower is 2.35m tall.
How many blocks did Sheila use?

6) Dani thinks of a number.
She doubles it then adds 3.
She gets the answer of 15.
What number did she think of?

7) Josh subtracts 12 from his number then multiplies the answer by 3. He gets the same number he started with. What was it?

8) Ms Jones prints booklets.

PRINT CHARGES

3p per page
£1.35 for the cover

Jon pays £5.25 for his book, including the cover.
How many pages are in his book?

9) If you take Harriet's age, add three and double it, you get her mum's age.

If you add their ages together, you get a total of 57, how old is Harriet and how old is her mum?

DIVE DEEPER 3

10) Dora makes patterns with lolly sticks.

a) Complete the table:

Number of squares	1	2	3	4	10	20
Number of lolly sticks	4	7				

b) Eva says that she will need 35 lolly sticks to make 10 squares.

You need 35 lolly sticks to make 10 squares. I multiplied the number needed for 2 squares by 5

Eva

Show that Eva is wrong.

11) An hourglass contains 720g of sand.
20g of sand trickles out every minute.
How much sand is left after 15 minutes?

12) I pay £35 for a printer.

I use it to print leaflets.

I charge 75p per leaflet.

How many leaflets do I need to print to earn the cost of the printer back?

SELF-ASSESSMENT

- Some will even use inverse equations
- Some will use formula too
- Most will be to draw tables and function machines
- All will use draw tables to answer questions

I charge £12 per hour to teach maths. I always charge £8 to cover my travel costs. Can you complete the table below?

| Input | → | ×12 | → | +8 | → | Output |

Hours	1	2	3	4	5	10
Cost	20	32	44	56	68	128

An electrician charges a £7.50 callout fee. They then charge £25 for each hour worked. Complete the table to show the costs.

| Input | → | ×25 | → | +7.50 | → | Output |

Hours	1	2	3	4	5	10
Cost (£)	32.50	57.50	82.50	107.50	132.50	257.50

When I sell cakes, I charge £1.25 for a bag to carry the cakes in. Each cake costs 70p. Complete the table:

| Input | → | ×70 | → | +125 | → | Output |

Cakes	1	2	3	4	5	10
Cost (p)	195	265	335	405	475	825

DIVE DEEPER 1 - ANSWERS

1) Joe and Nadia are using the following formula to work out what they should charge for 4 hours cleaning.

Cost = £20 + £10 x number of hours

Input → ×10 → +20 → Output

Joe thinks he should be paid £60.
Nadia thinks they should be paid £120.
Joe is correct – they should charge £60.

2) Maria bakes cakes and sells them in bags.

She uses this formula to
work out how much to charge.

Cost = number of cakes × 20p + 15p for the bag

Input → ×20 → +15 → Output

a) How much will 12 cakes cost? £2.55
b) Olivia buys a bag of cakes for £5.15.
25 cakes

3) There is a £2.00 charge to turn the lights on at the squash court. It then costs 15p per minute.

In → ×15 → +200 → Out

b) How much would a 30 minute game cost me? £6.50

4) I order some photos online.
Each photo costs 55p.
There is a £1.50 delivery charge.

a) How much would 20 photos cost? £12.50
b) If I spent £7, how many photos did I buy? 10 photos

5) A theme park sells tickets online.
Each ticket costs £24.
There is a £3 charge for buying tickets.

In → ×24 → +3 → Out

DIVE DEEPER 2 - ANS

5) Sheila stacks blocks onto a base.
The base is 15cm tall.
Each block is 10cm tall.

In	→	x10	→	+15	→	Out

a) Sheila uses 8 blocks.
How tall is the tower?
95cm
b) The tower is 2.35m tall.
How many blocks did Sheila use?
22 blocks

6) Dani thinks of a number.
She doubles it then adds 3.
She gets the answer of 15.
What number did she think of? 6

7) Josh subtracts 12 from his number then multiplies the answer by 3. He gets the same number he started with. What was it? 18

8) Ms Jones prints booklets.

PRINT CHARGES

3p per page
£1.35 for the cover

Jon pays £5.25 for his book, including the cover.
How many pages are in his book? 130

9) If you take Harriet's age, add three and double it, you get her mum's age.

If you add their ages together, you get a total of 57, how old is Harriet and how old is her mum? Harriet = 17 Mum = 40

DIVE DEEPER 3 - ANS

10) Dora makes patterns with lolly sticks.

a) Complete the table:

Number of squares	1	2	3	4	10	20
Number of lolly sticks	4	7	10	13	31	61

b) Eva says that she will need 35 lolly sticks to make 10 squares.

You need 35 lolly sticks to make 10 squares. I multiplied the number needed for 2 squares by 5

Eva

10 squares needs 31 sticks: 3n + 1

12) An hourglass contains 720g of sand.
20g of sand trickles out every minute.
How much sand is left after 15 minutes?
15 x 20g = 300g out ∴ 420g left

13) I pay £35 for a printer.

I use it to print leaflets.

I charge 75p per leaflet.

How many leaflets do I need to print to earn the cost of the printer back?

47 leaflets