Number and Algebra: Fractions and Decimals:
Place Value Function Machine

Australian Curriculum

This lesson plan could be used to support the teaching and learning of the following Content Descriptions from the Australian Curriculum.

Y6: Number and Algebra, Fractions and Decimals

Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)

Multiply and divide decimals by powers of 10 (ACMNA130)

Child-Friendly Aim:

To multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.

Success Criteria:

I can compare and order decimal numbers.

I can multiply decimal numbers by 10, 100 and 1000.

I can divide numbers by 10, 100 and 1000, giving answers up to three decimal places.

Resources:

Lesson Pack

Whiteboards and pens

Key/New Words:

Decimal, fraction, tenth, hundredth, thousandth.

Preparation:

Get in Line Decimal Number Cards – one per class

Place Value Function Machine Activity Sheet – one per child

Extra Challenge Activity Sheet – as required

Prior Learning: It will be helpful if children have experience identifying the value of digits in whole numbers and recognise tenths and hundredths in the context of money and measurement.

Learning Sequence

Get in Line: Give each child a Get in Line Decimal Number Card. Children attempt to line up so that their numbers are all in order from smallest to biggest. They can show their number card to others, but should not talk.

Multiply/Divide by 10, 100 & 1000: Use the animated place value chart on the Lesson Presentation to help the children visualise what is happening to the digits in decimal numbers when they are multiplied or divided by 10, 100 or 1000.

Function Machine: Use the text and images displayed on the Lesson Presentation to introduce the place value machine which multiplies or divides numbers by 10, 100 or 1000. Work together as a class to calculate the output numbers.

Place Value Function Machine: Children complete the differentiated Place Value Function Machines Activity Sheet, to show they can multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.

Can the children multiply or divide decimals by 10, 100 or 1000 and find the answer to three decimal places?

Calculate the output number of a function machine multiplying and dividing numbers by 10, 100 or 1000.

Calculate the output or input number of a function machine multiplying and dividing numbers by 10, 100 or 1000.

Calculate the output number of a three-sequence function machine involving multiplying and dividing numbers by 10, 100 or 1000. An Extra Challenge Activity Sheet is also included.

Dice Game: At the start of each round, the children are given a decimal number shown on the Lesson Presentation. During each three-minute round, the children take it in turns to roll the dice. They then multiply and divide the number based on the number they roll: 1 = ×10, 2 = ÷ 1000, 3 = ×100, 4 = × 1000, 5 = ÷ 100, 6 = ÷ 10. The person with the biggest number at the end of the round wins a point.

Exploreit

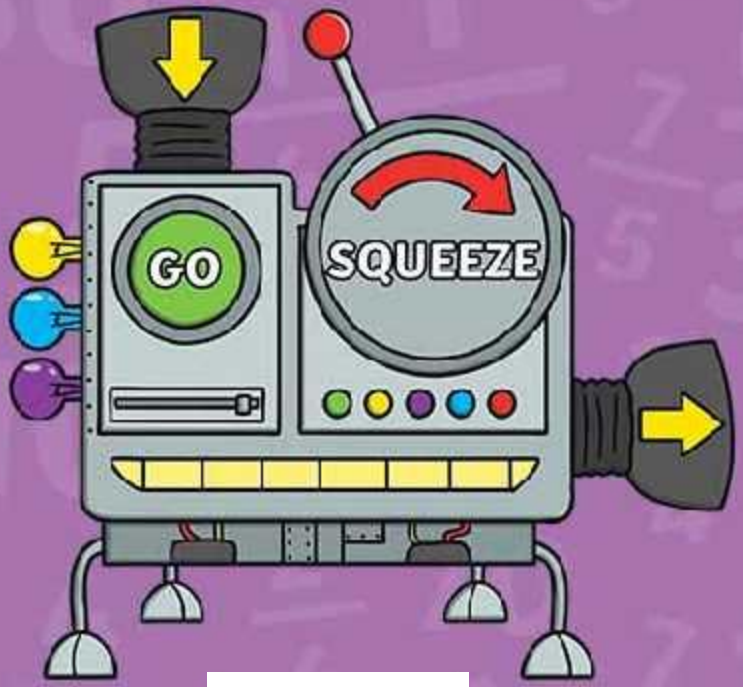
Exploreit: Ask children to bring in an old shopping receipt, or provide some receipts for them to look at. Ask the children to multiply and divide the prices of items by 10, 100 and 1000.

Buildit: Build decimal numbers using place value arrow cards. Explore how the arrow cards change when the numbers are multiplied and divided by 10, 100 and 1000.

Mathematics

Number and Algebra

Place Value Function Machine



Aim

- To multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.

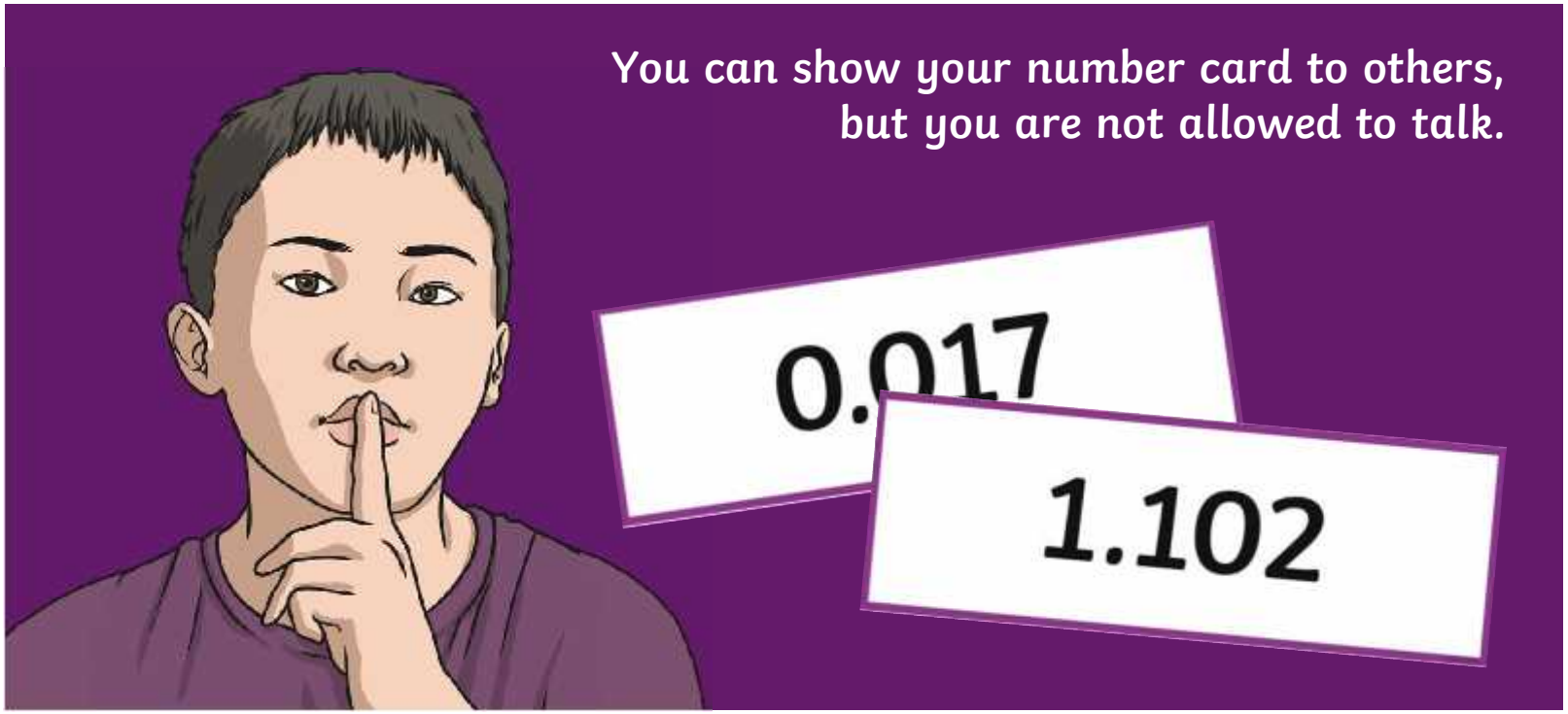
Success Criteria

- I can compare and order decimal numbers.
- I can multiply decimal numbers by 10, 100 and 1000.
- I can divide numbers by 10, 100 and 1000, giving answers up to three decimal places.

Get in Line!

Each person has a number card.

Your whole class challenge is to stand in a line so that all your numbers are in order from smallest to biggest!



Multiply by 10, 100 and 1000

When we multiply a decimal number by 10, the value of each digit is multiplied ten times.

Click on each digit on the on the place value chart to visualise this. We can describe multiplying a number by 10 by saying **that each digit is moving one space to the left**:

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
			1 •	3	2	5

× 10 × 10 × 10

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
			•			

1.325 x 10 = 13.25

Multiply by 10, 100 and 1000

When we multiply a decimal number by 100, the value of each digit is multiplied one hundred times.

Click on each digit on the on the place value chart to visualise this. We can describe multiplying a number by 100 by saying **that each digit is moving two spaces to the left**:

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
			1	3	2	5

× 100 × 100 × 100 × 100

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths

1.325 x 100 = 132.5

Multiply by 10, 100 and 1000

When we multiply a decimal number by 1000, the value of each digit is multiplied one thousand times.

Click on each digit on the on the place value chart to visualise this. We can describe multiplying a number by 1000 by saying **that each digit is moving three spaces to the left**:

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
			1 •	3	2	5

× 1000 × 1000 × 1000 × 1000

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
			•			

1.325 x 1000 = 1325

Multiply by 10, 100 and 1000

When we divide a number by 10, the value of each digit is divided ten times.

Click on each digit on the on the place value chart to visualise this. We can describe dividing a number by 10 by saying **that each digit is moving one space to the right**:

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
4	2	8	5			

÷ 10 ÷ 10 ÷ 10 ÷ 10

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths

4285 ÷ 10 = 428.5

Multiply by 10, 100 and 1000

When we divide a number by 100, the value of each digit is divided one hundred times.

Click on each digit on the on the place value chart to visualise this. We can describe dividing a number by 100 by saying **that each digit is moving two spaces to the right**:

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
4	2	8	5			

÷ 100 ÷ 100 ÷ 100 ÷ 100

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths

4285 ÷ 100 = 42.85

Multiply by 10, 100 and 1000

When we divide a number by 1000, the value of each digit is divided one thousand times.

Click on each digit on the on the place value chart to visualise this. We can describe dividing a number by 1000 by saying **that each digit is moving three spaces to the right**:

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
4	2	8	5 •			

÷ 1000 ÷ 1000 ÷ 1000 ÷ 1000

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
			•			

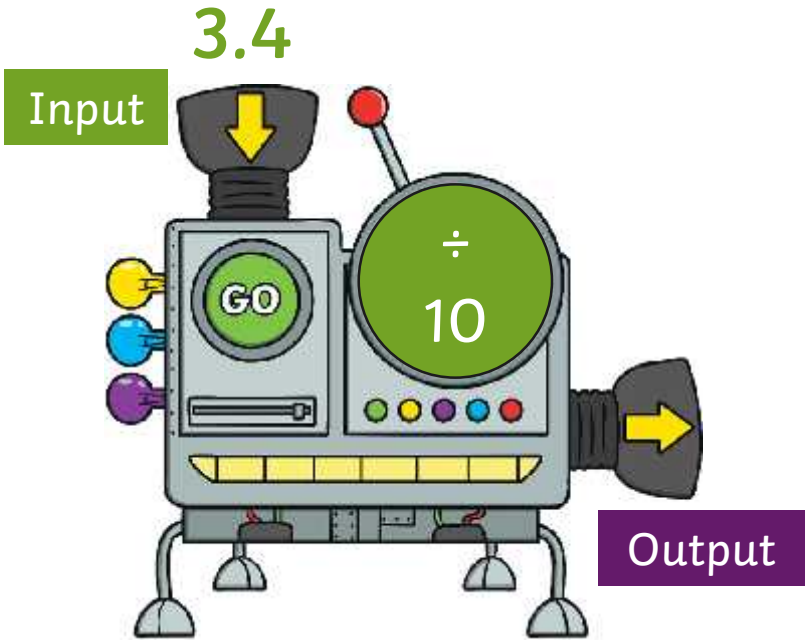
4285 ÷ 1000 = 4.285

Function Machine

This is the "Place-Value-O-Matic" function machine.

It multiplies and divides numbers by 10, 100 and 1000. Click on the input button to drop a number into the machine. Write the number you think will be created by the machine.

Click on the output button to see if you were correct!



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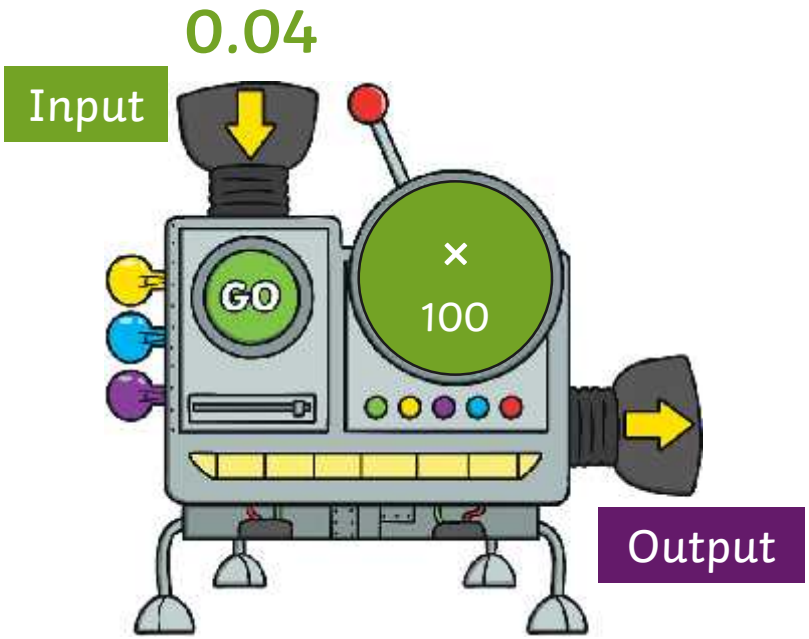

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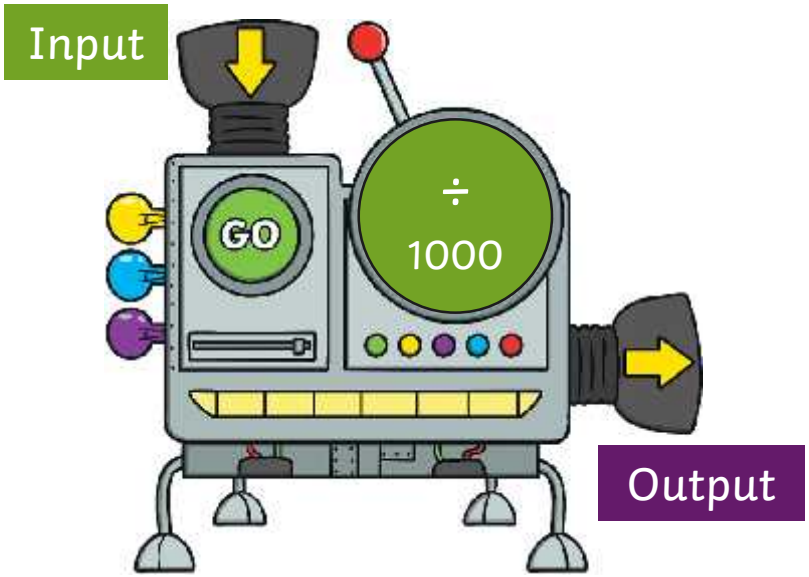
9062



Function Machine

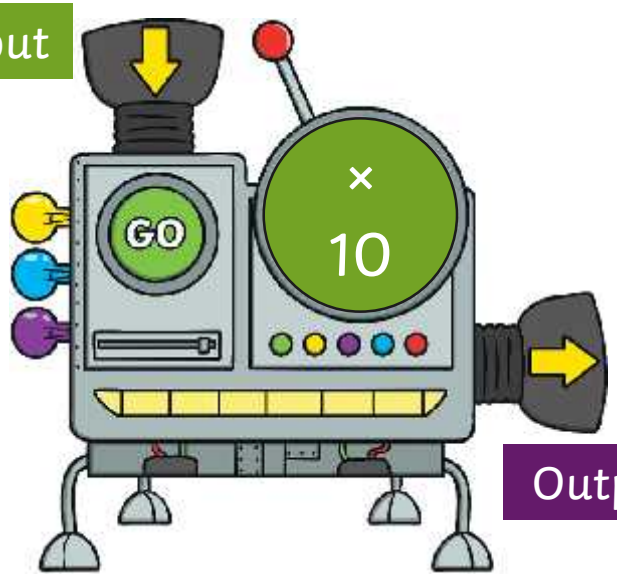
This is the "Place-Value-O-Matic" function machine.

It multiplies and divides numbers by 10, 100 and 1000. Click on the input button to drop a number into the machine. Write the number you think will be created by the machine.

Click on the output button to see if you were correct!

5.904

Input



Output

Function Machine

This is the "Place-Value-O-Matic" function machine.

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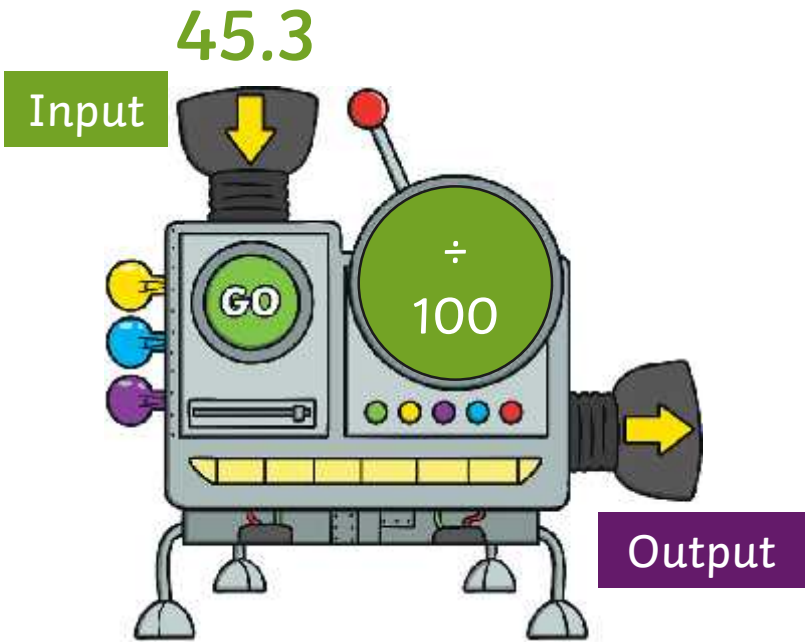

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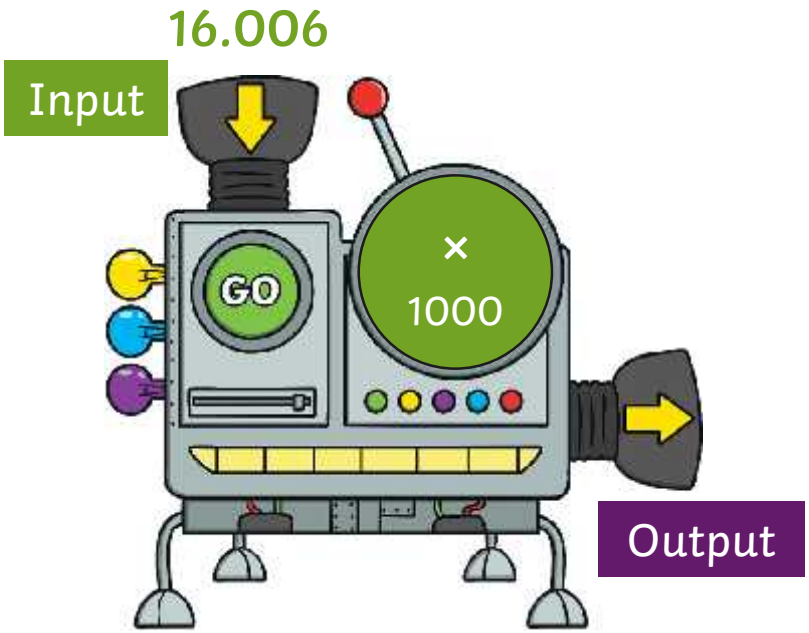
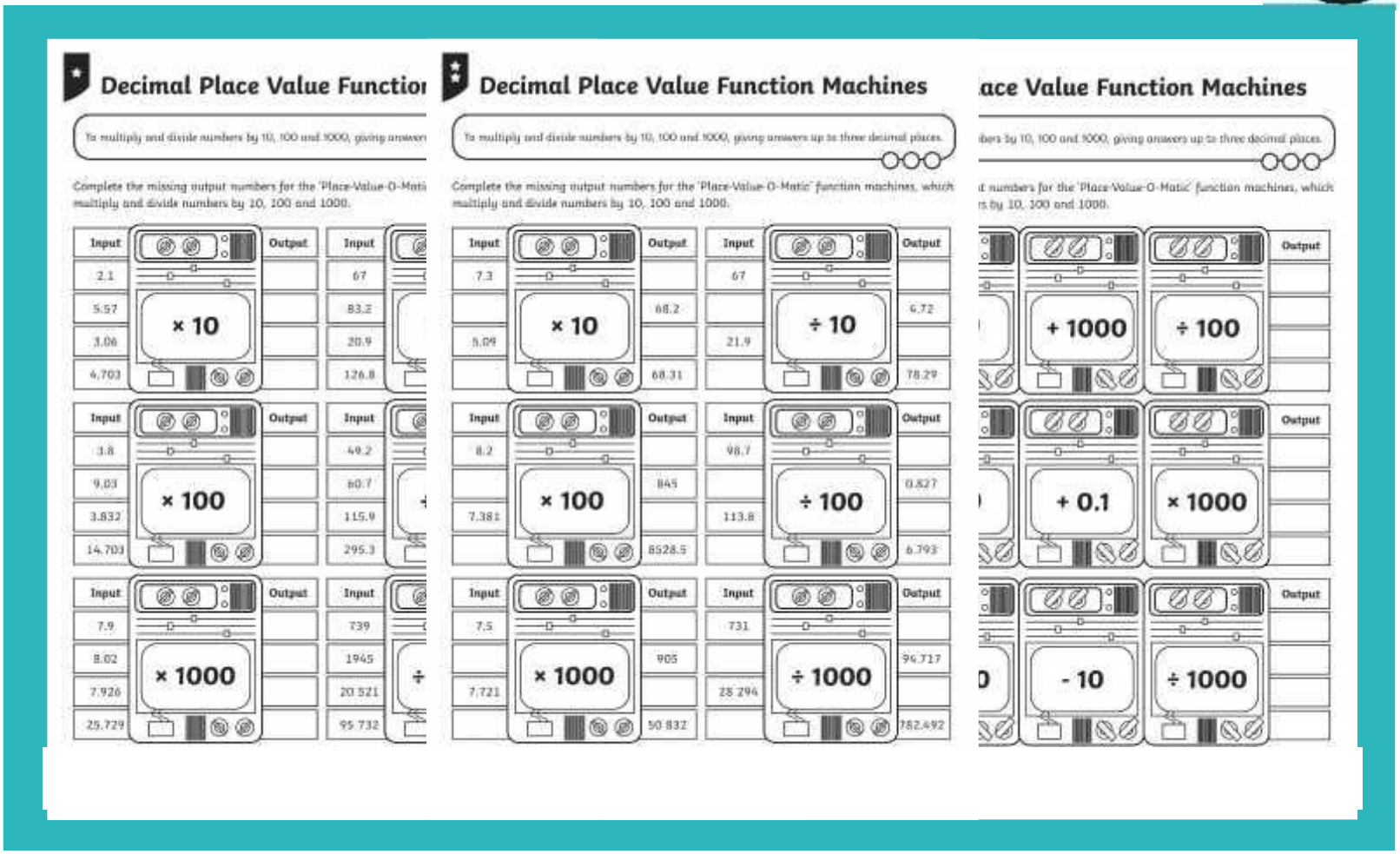


Place Value Function Machine



Decimal Place Value Functio

To multiply and divide numbers by 10, 100 and 1000, giving answers

Complete the missing output numbers for the 'Place-Value-O-Matic' multiply and divide numbers by 10, 100 and 1000.

Input	Output
2.1	
5.57	
3.06	
4.703	

× 10

Input	Output
67	
83.2	
20.9	
126.8	

Input	Output
3.8	
9.03	
3.832	
14.703	

× 100

Input	Output
49.2	
60.7	
115.9	
295.3	

Input	Output
7.9	
8.02	
7.926	
25.729	

× 1000

Input	Output
739	
1945	
20 521	
95 732	

Decimal Place Value Function Machines

To multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.

Complete the missing output numbers for the 'Place-Value-O-Matic' function machines, which multiply and divide numbers by 10, 100 and 1000.

Input	Output
7.3	
	68.2
6.09	
	68.31

× 10

Input	Output
67	
	6.72
21.9	
	78.29

÷ 10

Input	Output
8.2	
	845
7.381	
	8528.5

× 100

Input	Output
98.7	
	0.827
113.8	
	6.793

÷ 100

Input	Output
7.5	
	905
7.721	
	50 832

× 1000

Input	Output
731	
	96.717
28 294	
	782.492

÷ 1000

ace Value Function Machines

bers by 10, 100 and 1000, giving answers up to three decimal places.

t numbers for the 'Place-Value-O-Matic' function machines, which rs by 10, 100 and 1000.

Output

+ 1000

÷ 100

Output

+ 0.1

× 1000

Output

- 10

÷ 1000

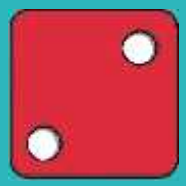
Dice Game

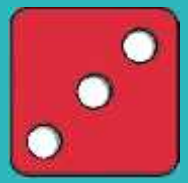
At the start of each round you will be given a decimal number.

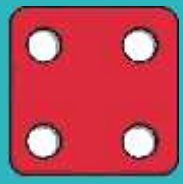
During each three-minute round, take it in turns to roll the dice. Multiply and divide the number based on the number you roll.

The person with the biggest number at the end of the round wins a point.

 = × 10

 = ÷ 1000

 = × 100

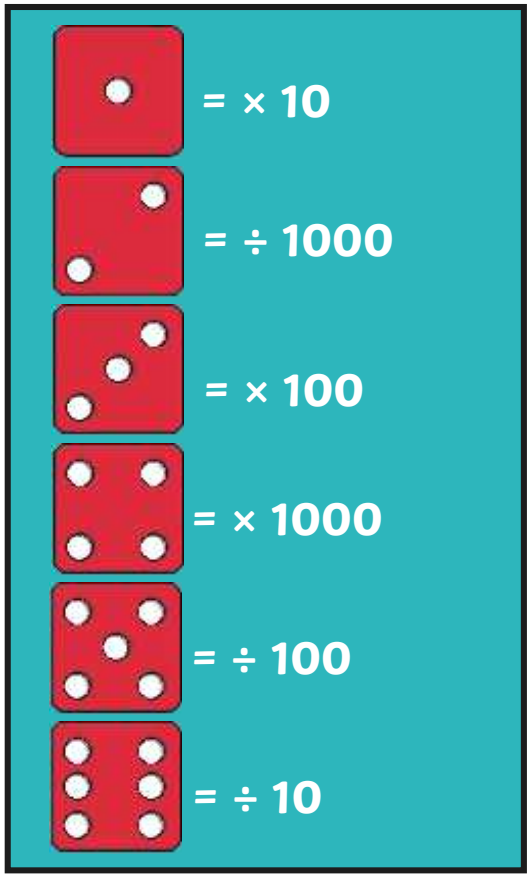
 = × 1000

 = ÷ 100

 = ÷ 10

Dice Game

Example



9.184

First I roll a 3 so
9.184 x 100 = 918.4

Then I roll a 5 so
918.4 ÷ 100 = 9.184

Then I roll a 4 so
9.184 x 1000 = 9184

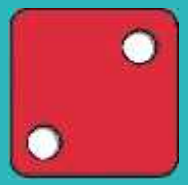
... until time's up!

Dice Game

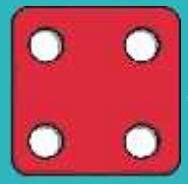
Round 1

5.372

 = × 10

 = ÷ 1000

 = × 100

 = × 1000

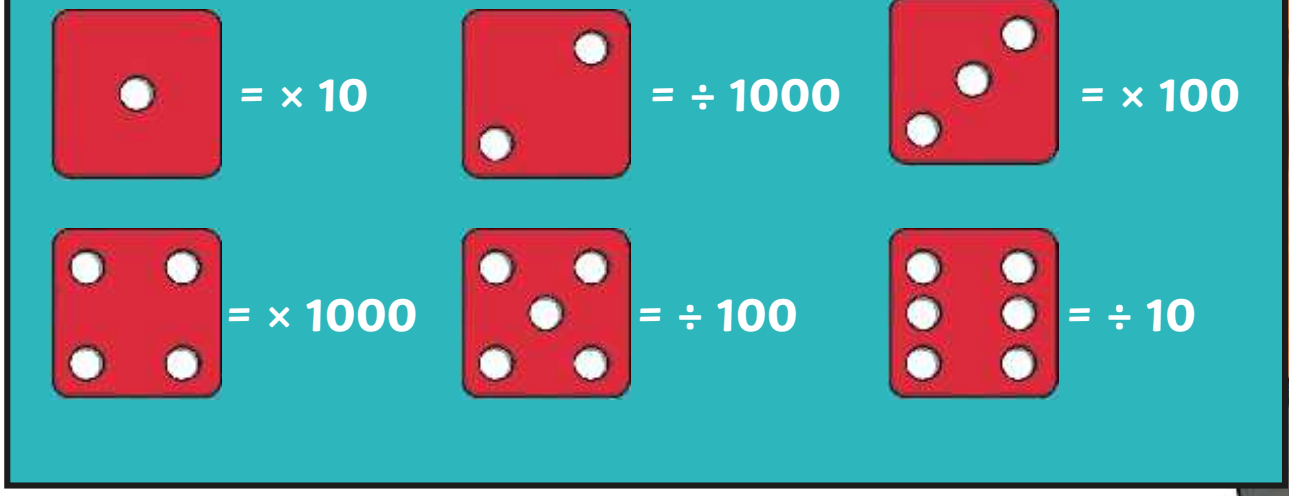
 = ÷ 100

 = ÷ 10

Dice Game

Round 2

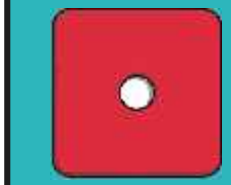
3.031

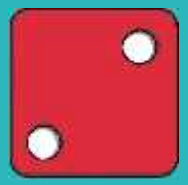


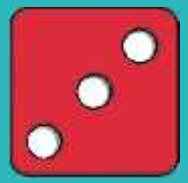
Dice Game

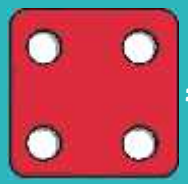
Round 3

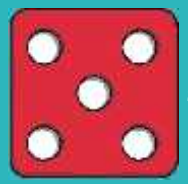
12.805

 = × 10

 = ÷ 1000

 = × 100

 = × 1000

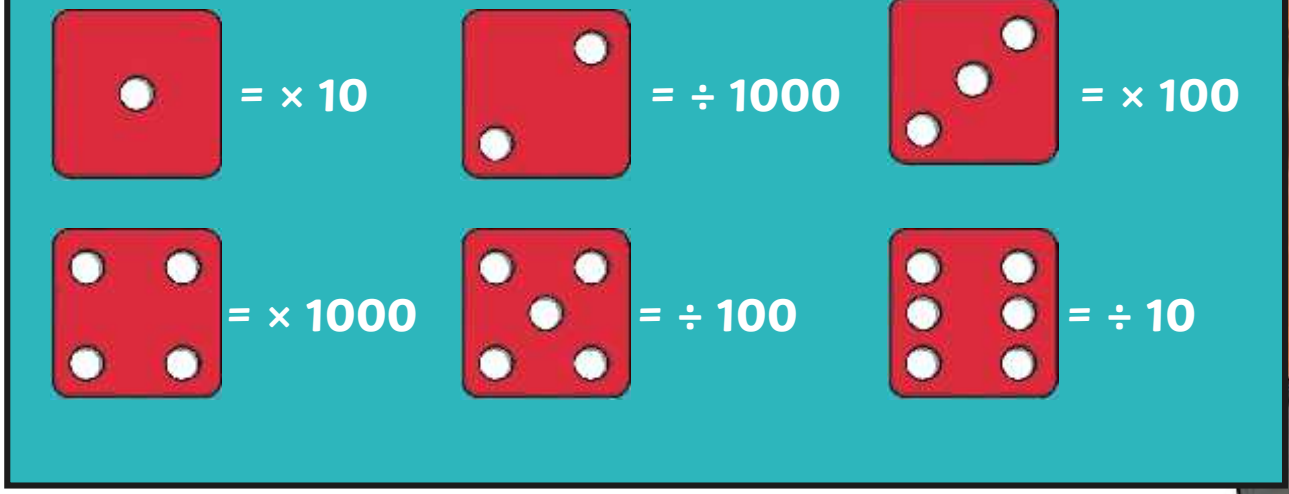
 = ÷ 100

 = ÷ 10

Dice Game

Round 4

390.651

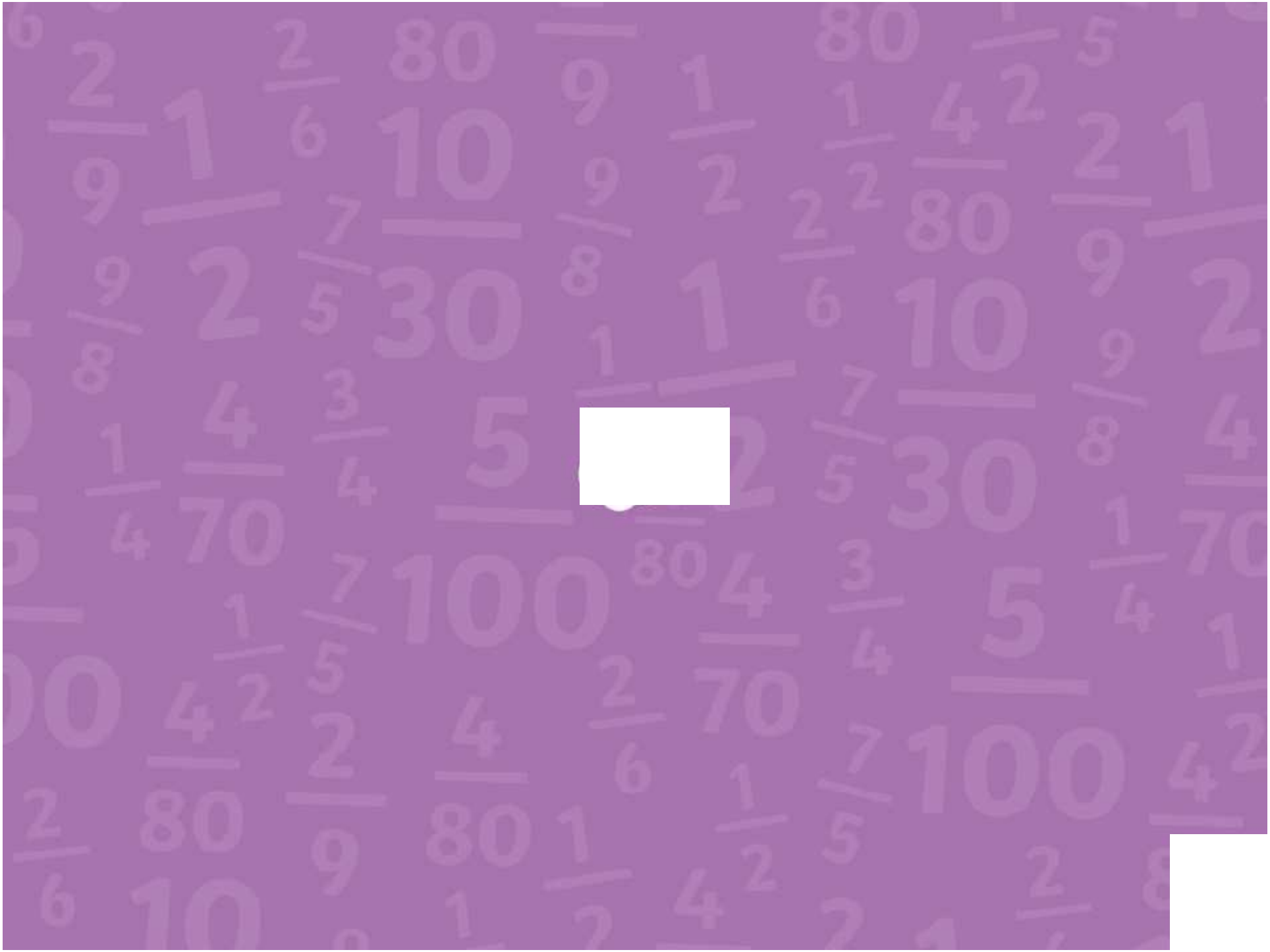


Aim

- To multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.

Success Criteria

- I can compare and order decimal numbers.
- I can multiply decimal numbers by 10, 100 and 1000.
- I can divide numbers by 10, 100 and 1000, giving answers up to three decimal places.



Aim: To multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.				**Date:**					
				Delivered By:			**Support:**		
Success Criteria	**Me**	**Friend**	**Teacher**	**T**	**PPA**	**S**	**I**	**AL**	**GP**
I can compare and order decimal numbers.				**Notes/Evidence**					
I can multiply decimal numbers by 10, 100 and 1000.									
I can divide numbers by 10, 100 and 1000, giving answers up to three decimal places.									
Next Steps) _____) _____									

T	Teacher	**I**	Independent
PPA	Planning, Preparation and Assessment	**AL**	Adult Led
S	Supply	**GP**	Guided Practice

Aim: To multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.				**Date:**					
				Delivered By:			**Support:**		
Success Criteria	**Me**	**Friend**	**Teacher**	**T**	**PPA**	**S**	**I**	**AL**	**GP**
I can compare and order decimal numbers.				**Notes/Evidence**					
I can multiply decimal numbers by 10, 100 and 1000.									
I can divide numbers by 10, 100 and 1000, giving answers up to three decimal places.									
Next Steps) _____) _____									

T	Teacher	**I**	Independent
PPA	Planning, Preparation and Assessment	**AL**	Adult Led
S	Supply	**GP**	Guided Practice

Calculation Maze Challenge

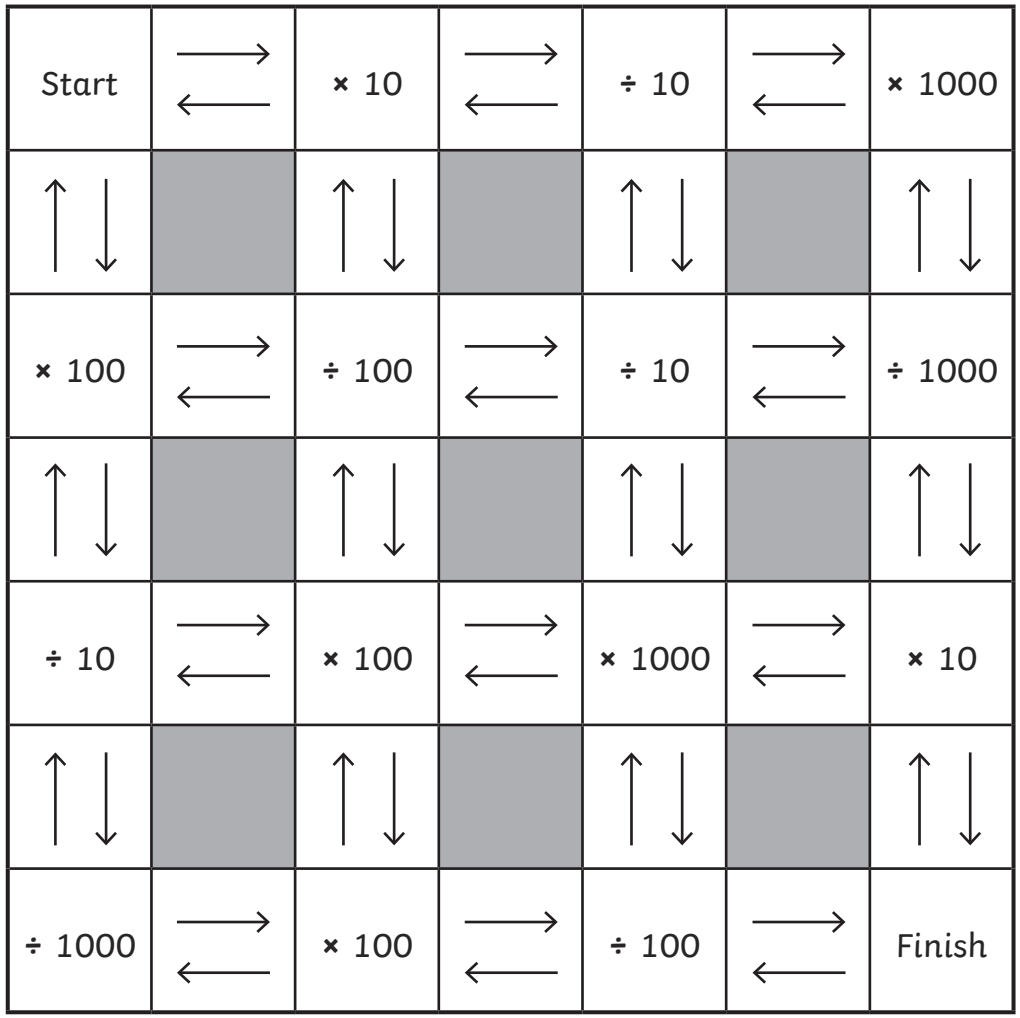
To multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.

Choose any decimal number to start with. You can only move on to each box once. You do not have to move on to every box.

Find a route through the maze that creates the smallest number at the finish:

Find a route through the maze that creates the biggest number at the finish:

Find a route through the maze that creates the same number at the start and finish:



Calculation Maze Challenge **Answers**

To multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.

Choose any decimal number to start with. You can only move on to each box once. You do not have to move on to every box.

Find a route through the maze that creates the smallest number at the finish:

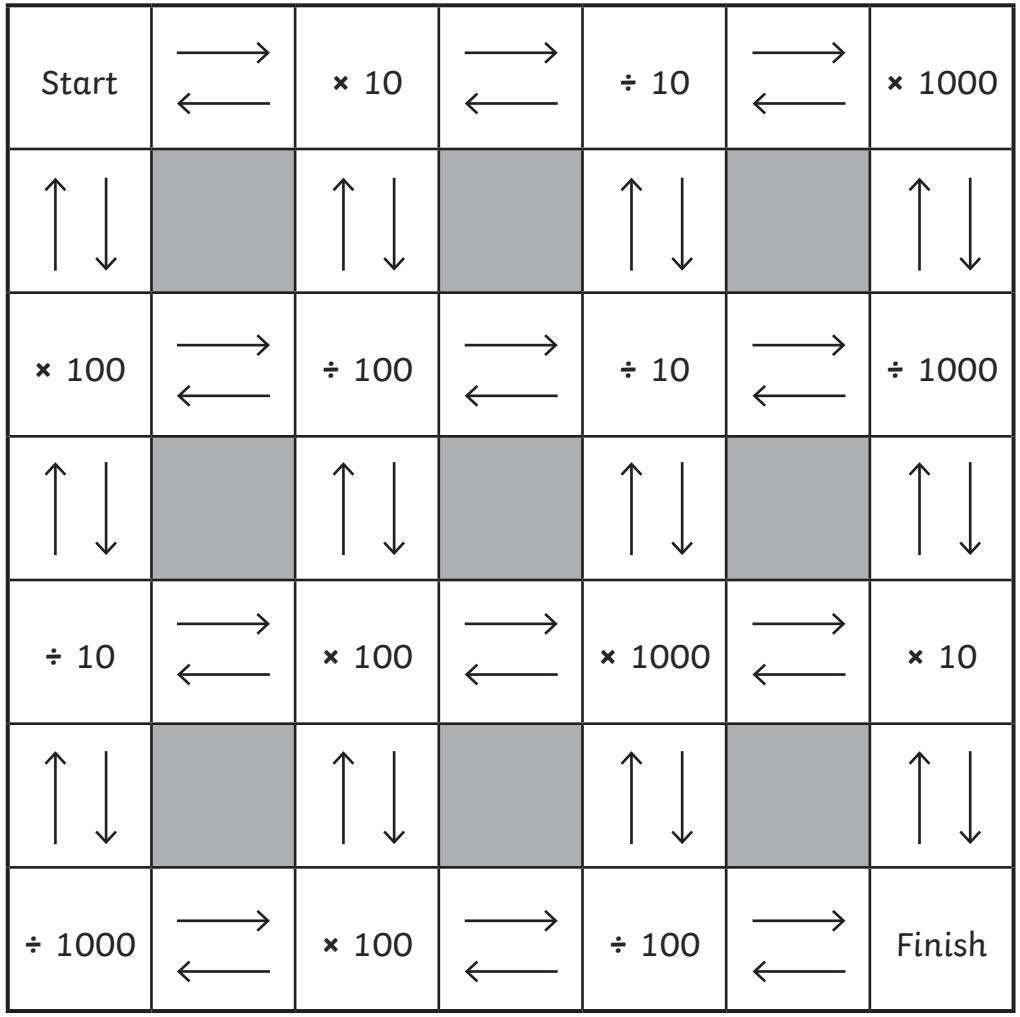
× 10, ÷ 100, ÷ 10, ÷ 1000, × 10

Find a route through the maze that creates the biggest number at the finish:

× 100, ÷ 10, × 100, × 1000, × 10

Find a route through the maze that creates the same number at the start and finish:

× 10, ÷ 10, × 1000, ÷ 1000, ÷ 10, × 1000, ÷ 100



0.017

1.102

0.136

0.242

0.026

0.132

0.214

0.284

0.302

0.321

0.432

0.504

0.312

0.326

0.454

0.552

0.604

0.629

0.766

0.784

0.612

0.633

0.775

0.799

0.814

0.837

0.867

0.899

0.901

0.948

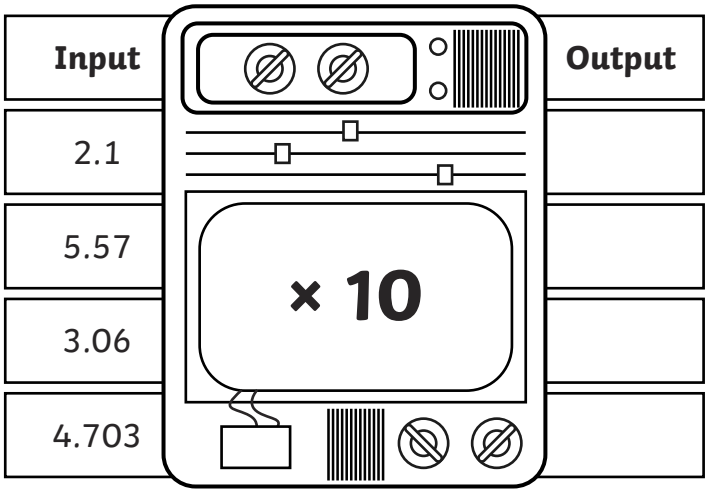
0.956

0.999

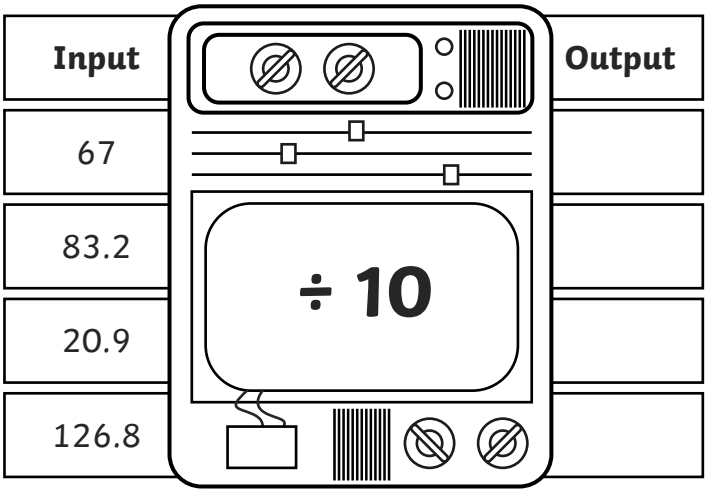
Place Value Function Machines

To multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.

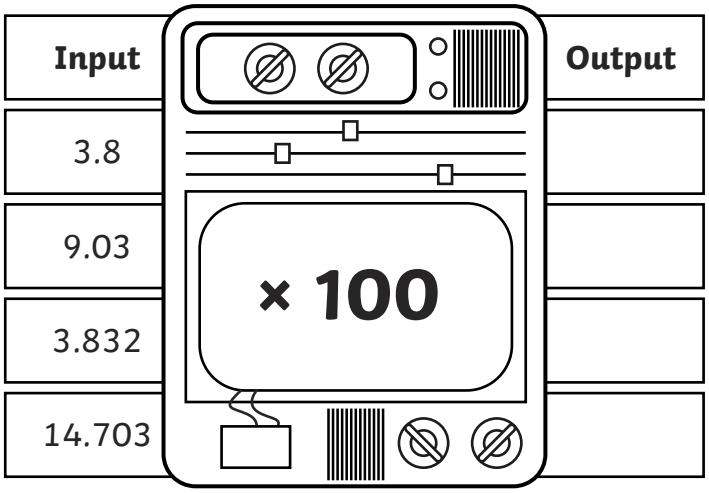
Complete the missing output numbers for the 'Place-Value-O-Matic' function machines, which multiply and divide numbers by 10, 100 and 1000.



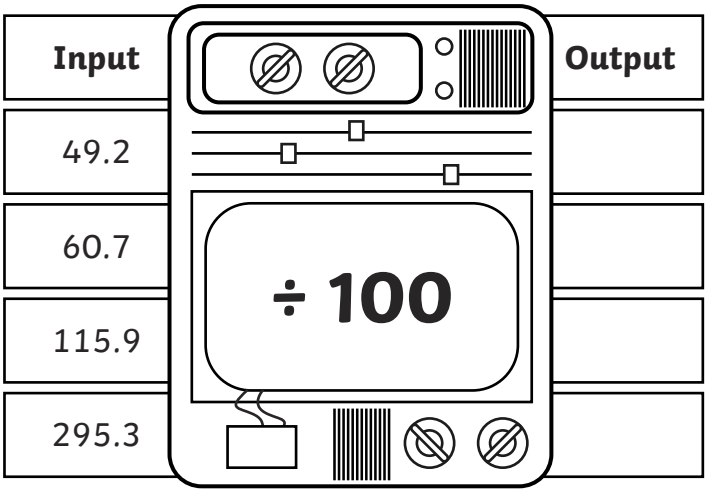
Input	Output
2.1	
5.57	
3.06	
4.703	



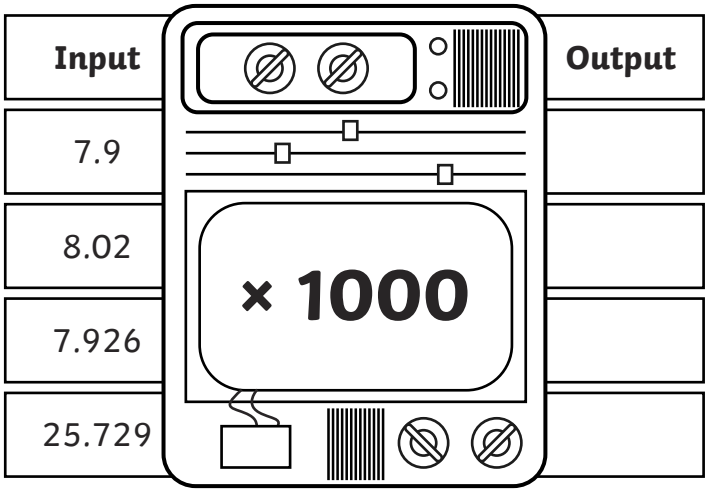
Input	Output
67	
83.2	
20.9	
126.8	



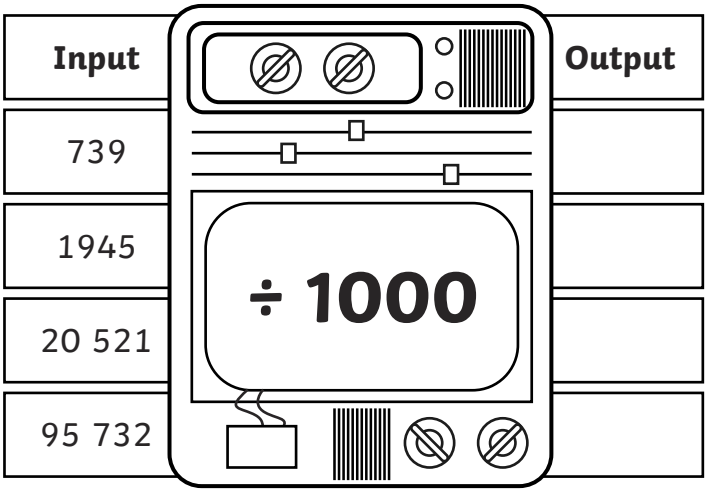
Input	Output
3.8	
9.03	
3.832	
14.703	



Input	Output
49.2	
60.7	
115.9	
295.3	



Input	Output
7.9	
8.02	
7.926	
25.729	

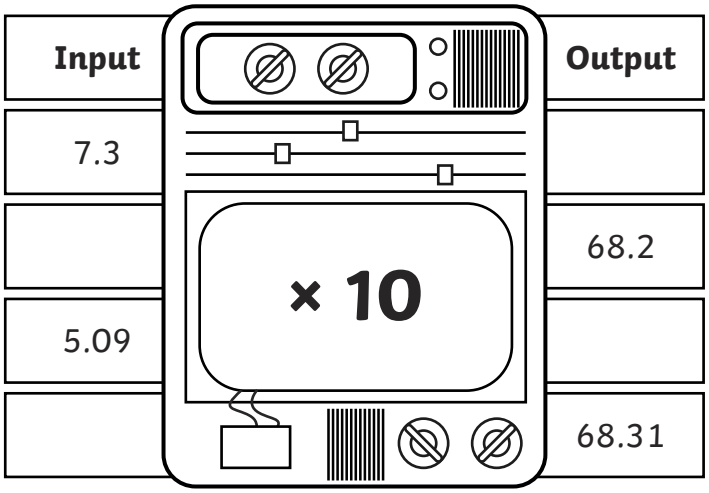


Input	Output
739	
1945	
20 521	
95 732	

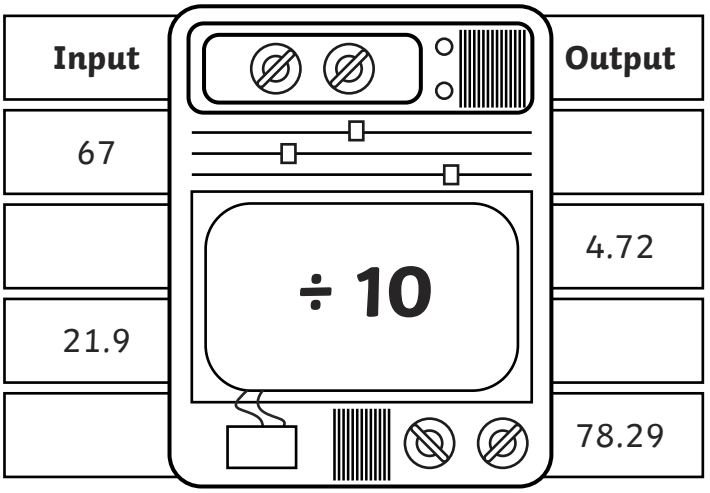
Place Value Function Machines

To multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.

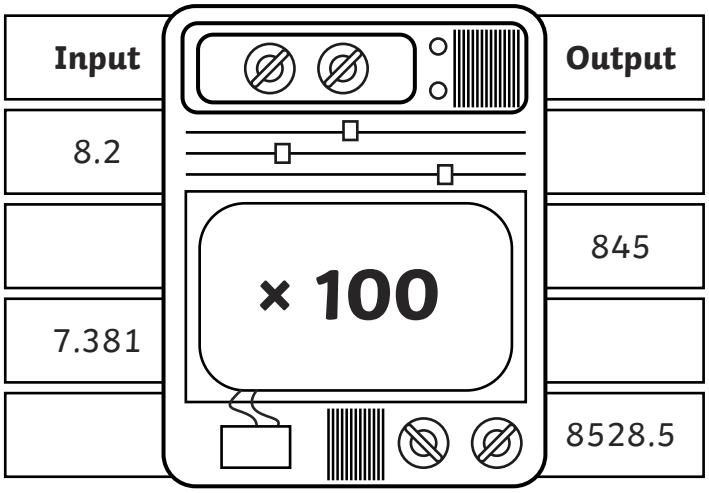
Complete the missing output numbers for the 'Place-Value-O-Matic' function machines, which multiply and divide numbers by 10, 100 and 1000.



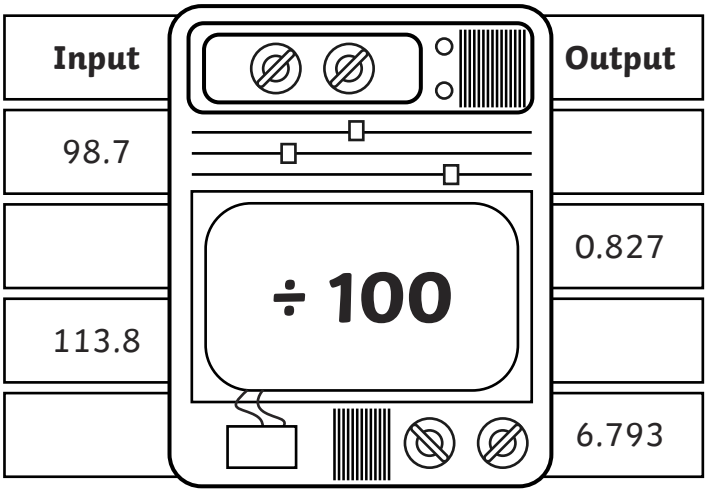
Input	Output
7.3	
	68.2
5.09	
	68.31



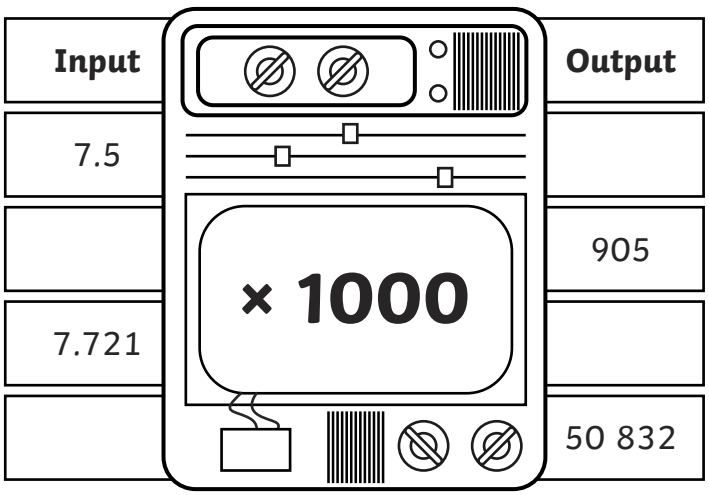
Input	Output
67	
	4.72
21.9	
	78.29



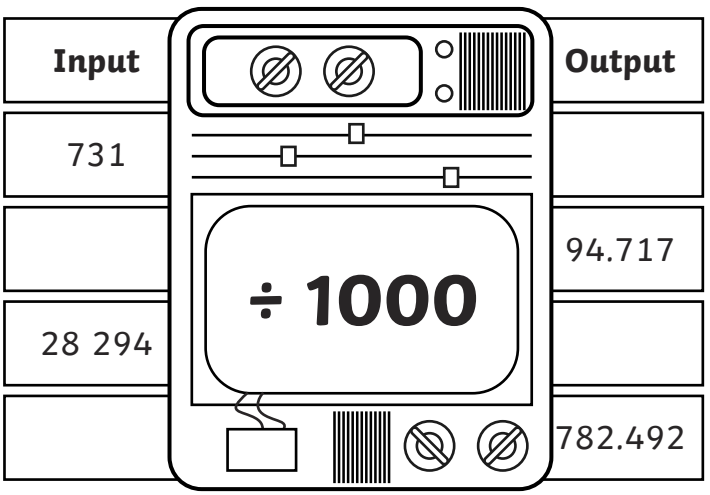
Input	Output
8.2	
	845
7.381	
	8528.5



Input	Output
98.7	
	0.827
113.8	
	6.793



Input	Output
7.5	
	905
7.721	
	50 832



Input	Output
731	
	94.717
28 294	
	782.492

Place Value Function Machines

To multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.

Complete the missing output numbers for the 'Place-Value-O-Matic' function machines, which multiply and divide numbers by 10, 100 and 1000.

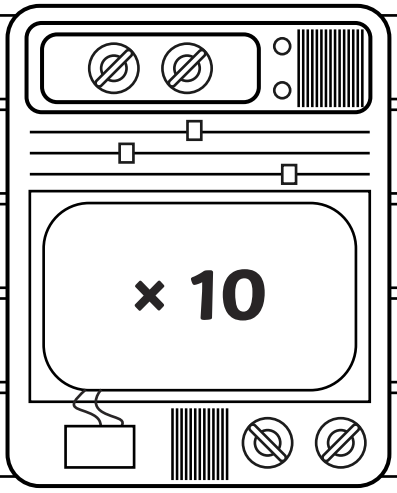
Input	× 10	+ 1000	÷ 100	Output
52.1				
95.57				
13.06				
47.03				

Input	÷ 10	+ 0.1	× 1000	Output
3.8				
9.03				
3.832				
14.703				

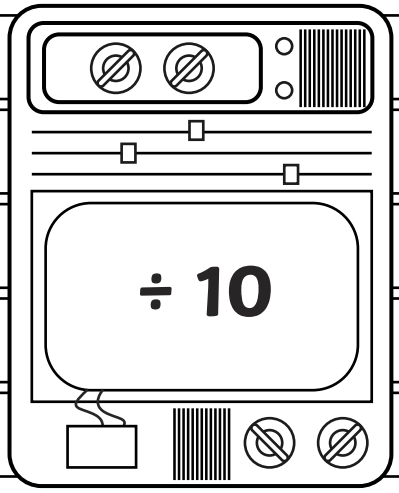
Input	× 100	- 10	÷ 1000	Output
7.9				
8.02				
79.26				
25 729				

Place Value Function Machines **Answers**

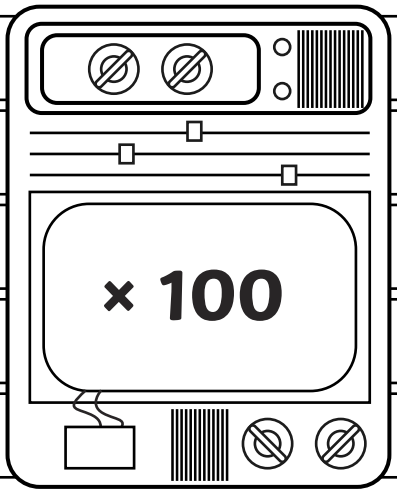
Complete the missing output numbers for the 'Place-Value-O-Matic' function machines, which multiply and divide numbers by 10, 100 and 1000.



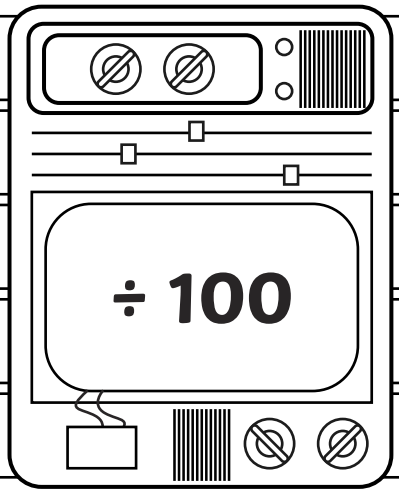
Input	Output
2.1	21
5.57	55.7
3.06	30.6
4.703	47.03



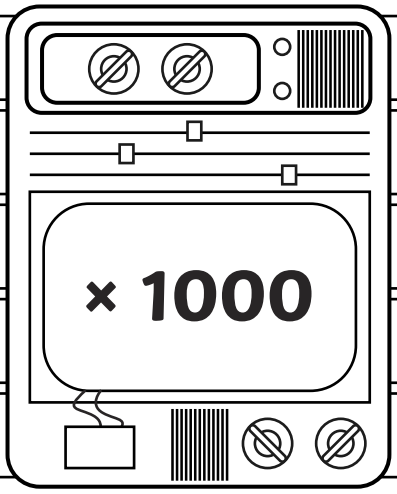
Input	Output
67	6.7
83.2	8.32
20.9	2.09
126.8	12.68



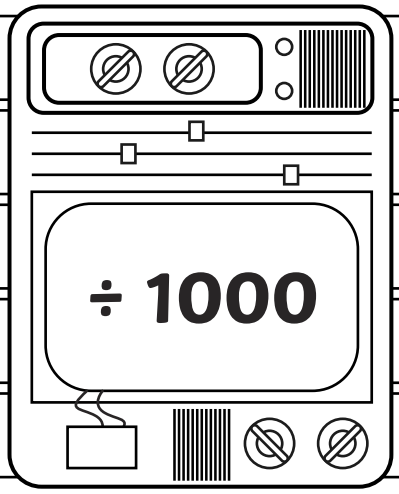
Input	Output
3.8	380
9.03	903
3.832	383.2
14.703	1470.3



Input	Output
49.2	0.492
60.7	0.607
115.9	1.159
295.3	2.953



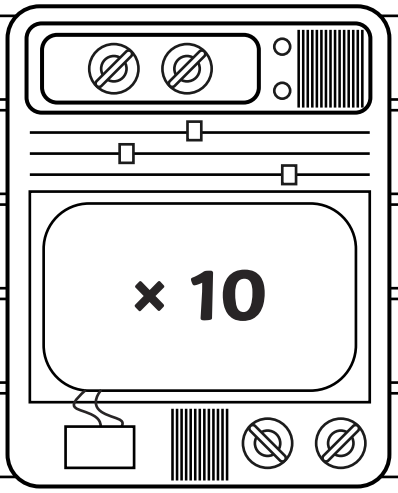
Input	Output
7.9	7900
8.02	8020
7.926	7926
25.729	25 729



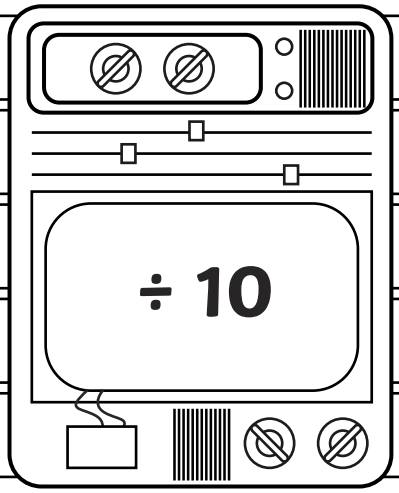
Input	Output
739	0.739
1945	1.945
20 521	20.521
95 732	95.732

Place Value Function Machines **Answers**

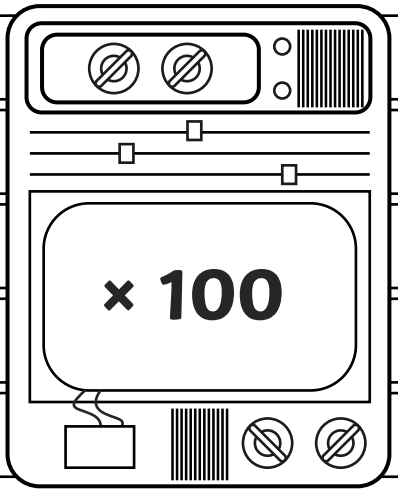
Complete the missing output numbers for the 'Place-Value-O-Matic' function machines, which multiply and divide numbers by 10, 100 and 1000.



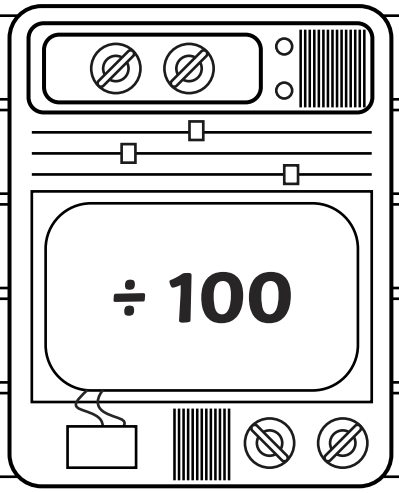
Input	Output
7.3	73
6.82	68.2
5.09	50.9
6.831	68.31



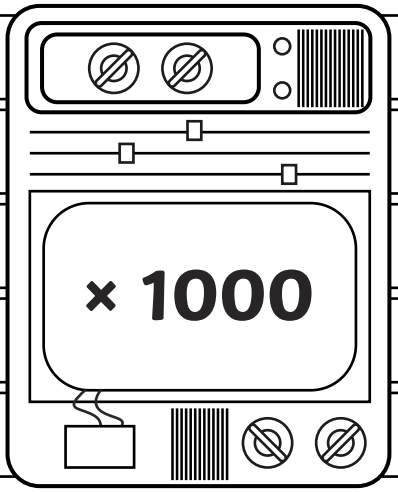
Input	Output
67	6.7
47.2	4.72
21.9	2.19
782.9	78.29



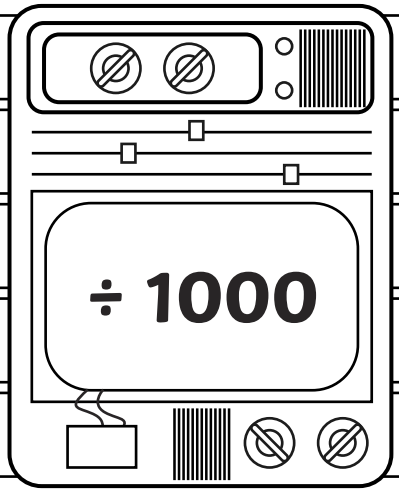
Input	Output
8.2	820
8.45	845
7.381	738.1
85.285	8528.5



Input	Output
98.7	0.987
82.7	0.827
113.8	1.138
679.3	6.793



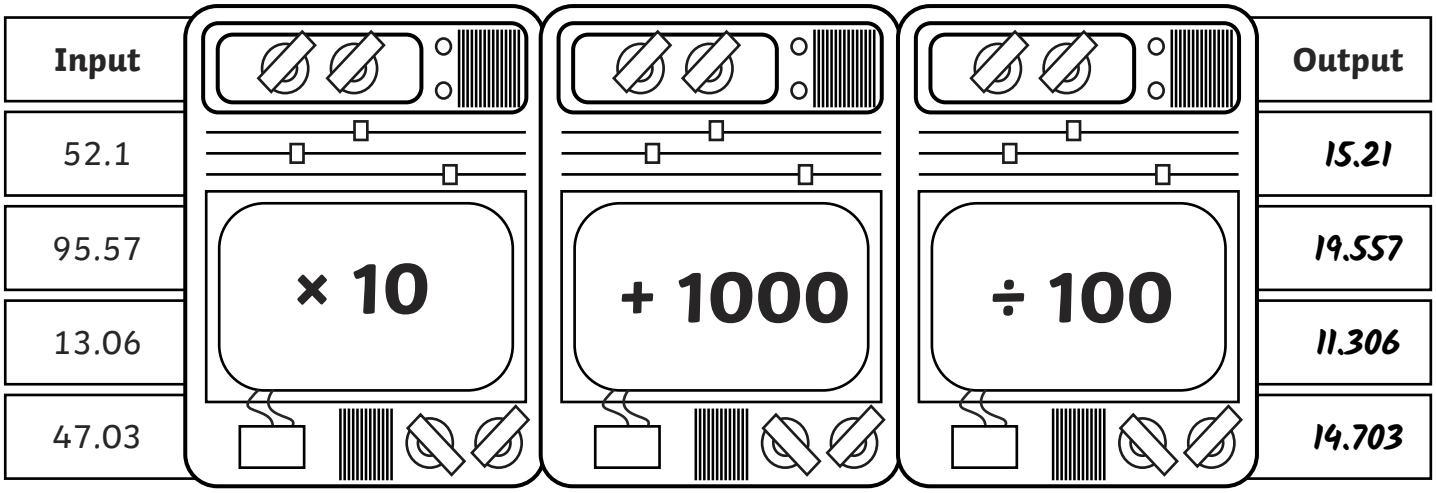
Input	Output
7.5	7500
0.905	905
7.721	7721
50.832	50 832

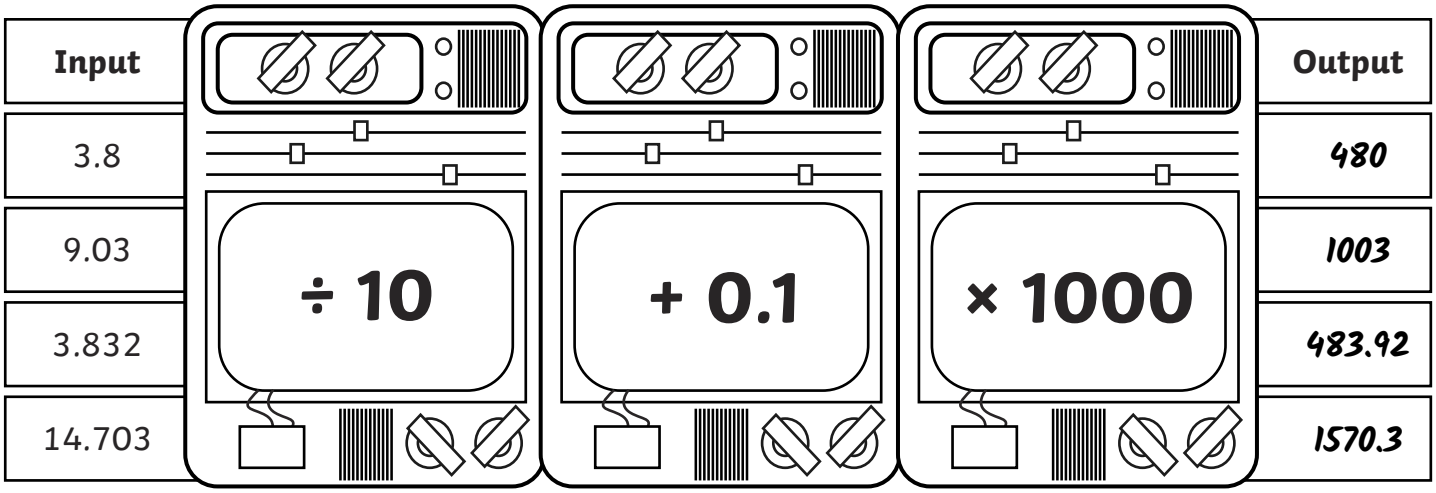


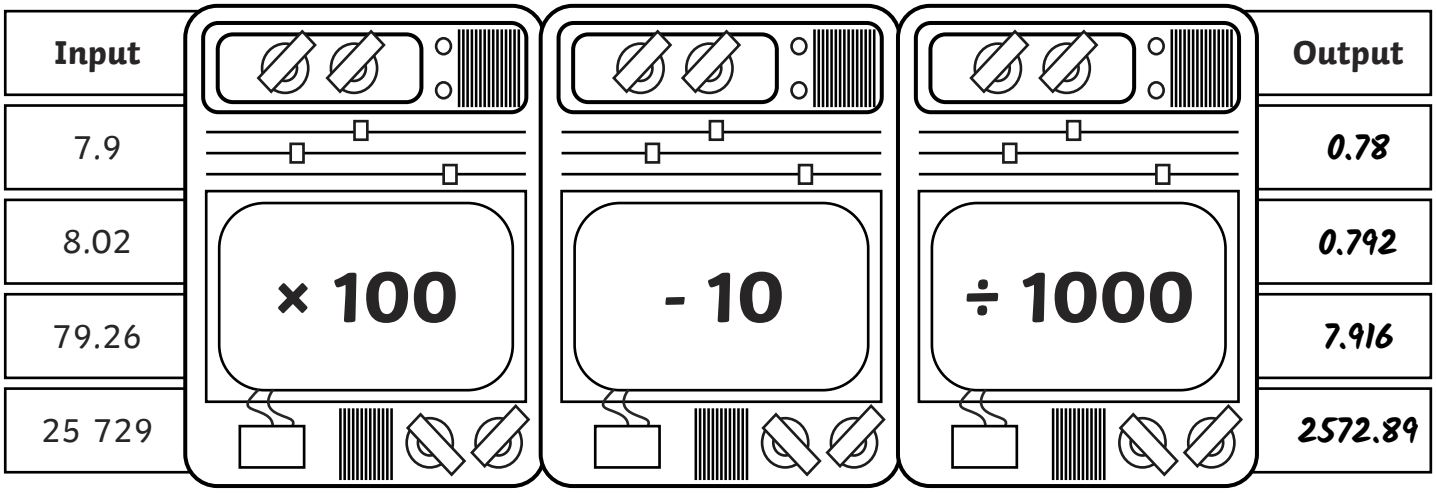
Input	Output
731	0.731
94 717	94.717
28 294	28.294
782 492	782.492

Place Value Function Machines **Answers**

Complete the missing output numbers for the 'Place-Value-O-Matic' function machines, which multiply and divide numbers by 10, 100 and 1000.







Avery Template: Name Badge Label, 8 per sheet | Compatible Products:15395, 25395, 42395, 45395, 48395, 5395, 8395, 88395, 85395.

Number and Algebra | Place Value Function Machine

To multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.		
I can compare and order decimal numbers.		
I can multiply decimal numbers by 10, 100 and 1000.		
I can divide numbers by 10, 100 and 1000, giving answers up to three decimal places.		

Number and Algebra | Place Value Function Machine

To multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.		
I can compare and order decimal numbers.		
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I can compare and order decimal numbers.		
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