

# White Rose Answers (Year 6)

Monday

# Find a rule – two step

1 Use the function machine to complete the table.



Input	1	2	3	5	10	50
Output	7	12	17	27	52	252

2 Here is the same function machine with the steps in the reverse order.



Teddy

The outputs will be the same.



Jack

The outputs will be different.

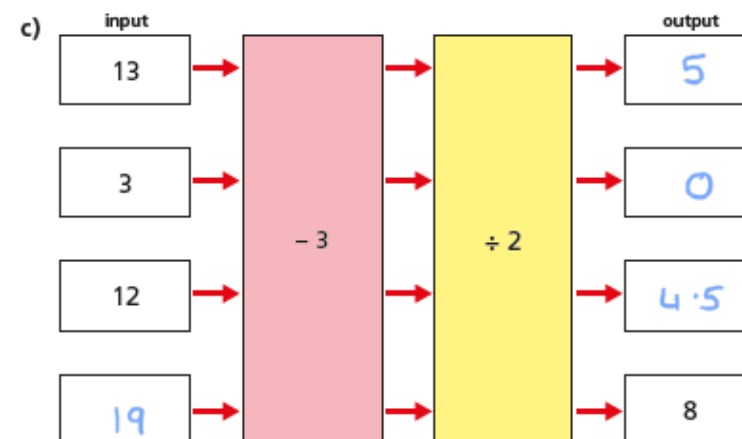
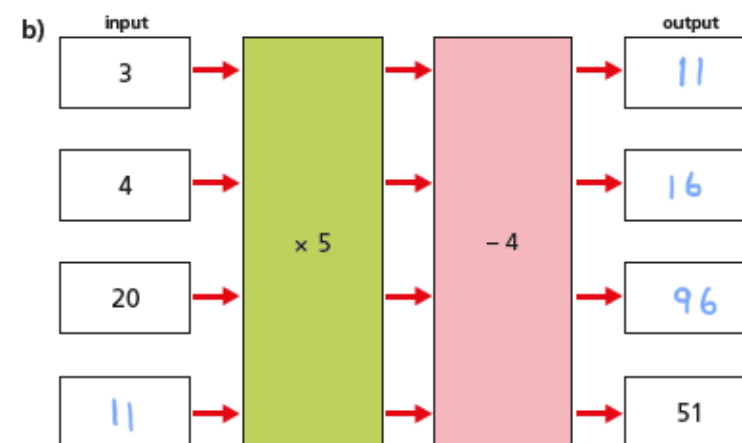
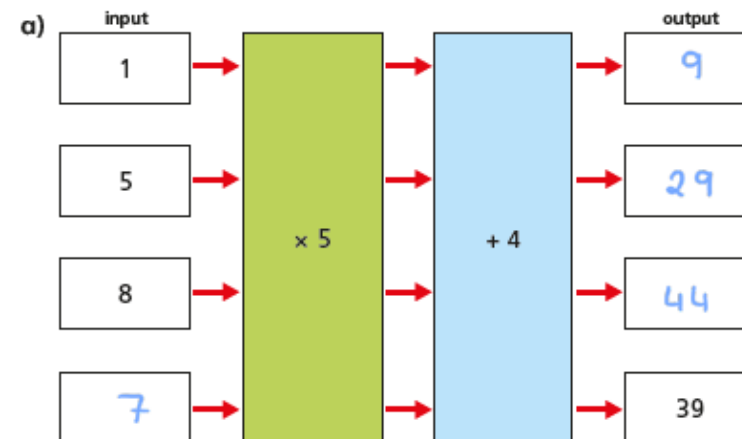
Explain to a partner who you think is correct.

Use the function machine to complete the table.

Input	1	2	3	5	10	50
Output	15	20	25	35	60	260

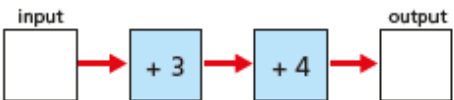
Who is correct? Jack

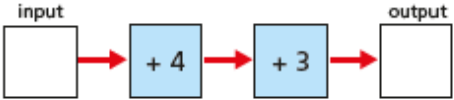
3 Work out the missing outputs and inputs.




4


Tick the pairs of function machines that will give the same outputs for a given input.

a)  ☒



b)  ☐



c)  ☒



Explain your reasoning to a partner.

5

Here are some 2-step function machines.


For each machine, write a single step that would give the same output.

Check your answers by inputting values.

a)   $\times 10$

b)   $+ 10$

c)

  $\times 4$

Can all 2-step function machines be written as a 1-step function machine?

Talk about it with a partner.

6

Here is a function machine.



a) Complete the table.

Input	10	3	13	73
Output	28	0	40	280

b) Rosie puts a number into the machine and she gets out the same number.

Work out Rosie's number.

4

7

Mr Hall and Mrs Rose order some photos online.

a) Mr Hall orders 16 photos.

How much does he pay?



£4.45

b) Mrs Rose pays £6.05

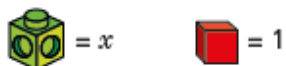
How many photos did she order?

24

Tuesday

# Forming expressions

- 1 Tommy uses multilink cubes to represent an unknown number and base ten ones to represent 1



Write algebraic expressions to describe the sets of cubes.

The first one has been done for you.

a)  $2x + 3$

b)  $3x + 5$

c)  $3x$

d)  $x + 3$

e)  $2x + 5$

f)  $5x + 2$

g)  $2x + 6$

h)  $4x + 9$



- 2 Use Tommy's method to represent these expressions.

a)  $x + 2$

c)  $3x + 1$

b)  $2x$

d)  $x + 6$

Compare answers with a partner.

- 3 Use cubes to help you simplify the following expressions.

The first one has been done for you.

a)  $2y + 5 + y$

$3y + 5$

b)  $3a + 2 + a + a$

$5a + 2$

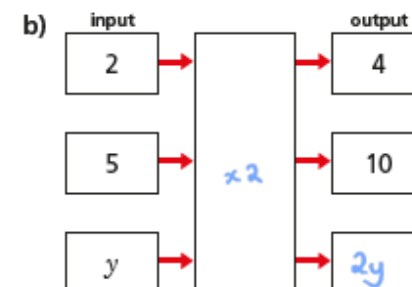
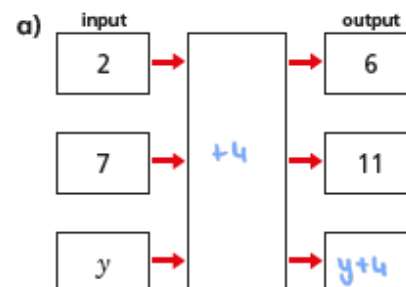
c)  $6p + 2 - 2p$

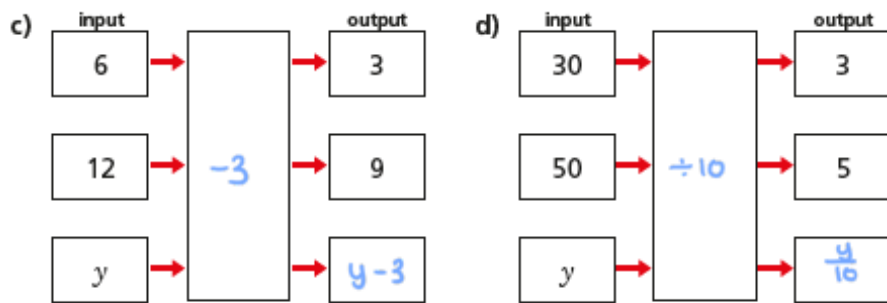
$4p + 2$

d)  $m + 4 + 3m - 3$

$4m + 1$

- 4 Complete the function machines.



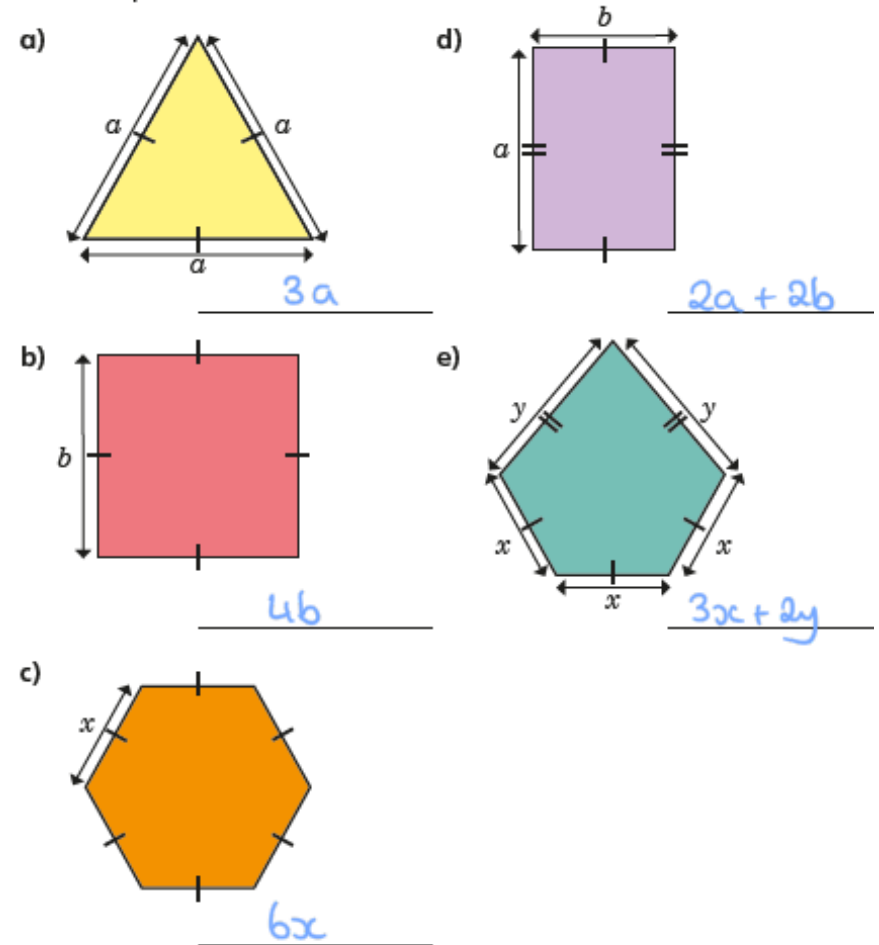


5 Match each statement to the equivalent algebraic expression.

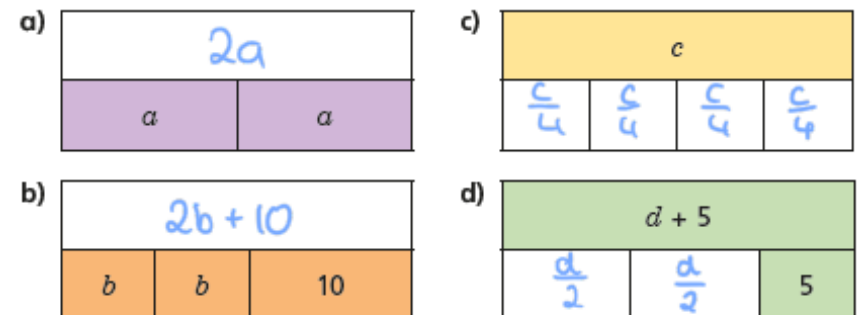
Write the missing statements.

5 more than $y$	$2y$
$y$ less than 5	$y - 5$
$y$ multiplied by 5	$5 - y$
$y$ divided by 5	$y + 5$
double $y$	$5y$
5 less than $y$	$y^2$
$y$ multiplied by $y$	$\frac{y}{5}$

6 Write an algebraic expression to represent the perimeter of each shape.



7 Complete the bar models.





Wednesday



# Substitution

1

 = 4     = 5

Use the given facts to work out the calculations.

a)  +  + 

13

b)  +  - 

3

c)  +  +  +  + 

23

2

 = 12     = 5

Use the given facts to work out the calculations.

a)  - 

7

b)  × 

60

c) Create your own calculation that will be equal to 22

e.g.  $\triangle + \square + \square$

3

If  $x = 5$ , write the values of the expressions in the corresponding grid.

The first one has been done for you.

$3x$	$x^2$	$2x - 5$
$4x + 2$	$\frac{x}{2}$	$2(x + 1)$
$7x$	$x + 9$	$x - 7$

15	25	5
22	2.5	12
35	14	-2

4

If  $a = 10$  and  $b = 6$ , work out the values of the expressions.

a)  $a + b =$  16

d)  $2a + b =$  26

b)  $a - b =$  4

e)  $3a - 17 =$  13

c)  $2a =$  20

f)  $2(a - b) =$  8

5

If  $m = \frac{4}{5}$  and  $k = 0.1$ , work out the value of  $m + 2k$

1

6



Mo

It does not matter what  $p$  and  $q$  are,  $p + q$  and  $q + p$  will always give the same answer.

Do you agree with Mo? Yes

Explain your answer.

Addition is commutative.

7

$$m = 7 \quad n = 5$$

Write  $>$ ,  $<$  or  $=$  to compare the expressions.

a)  $2m$   $>$   $10$

b)  $n - 1$   $<$   $5$

c)  $2n + m$   $<$   $2m + n$

d)  $7n$   $=$   $5m$

8

$$a = 10$$

Write the expressions in order, starting with the smallest value.

$$5a$$

$$a + 5$$

$$\frac{a}{5}$$

$$a^2$$

$$\frac{a}{5}$$

$$a + 5$$

$$5a$$

$$a^2$$

9

$$a = 15$$

Write three different algebraic expressions that give a value of 40  
e.g.

$$2a + 10$$

$$3a - 5$$

$$\frac{8a}{3}$$

10

Complete the table.

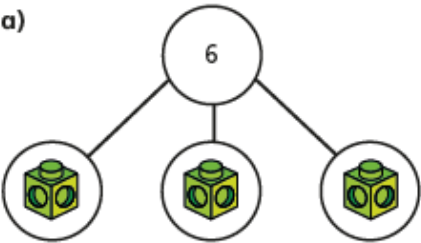
$x$	$5x$	$5x - 1$
2	10	9
10	50	49
12	60	59
5	25	24
7	35	34
20	100	99

Thursday


# Solve simple one-step equations

- 1 Write an equation for each part-whole model.  
Work out the value of the multilink cube in each equation.

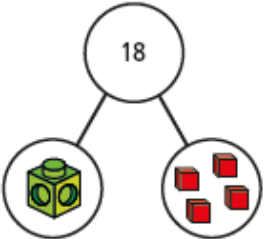
a)




$3x = 6$

 = 2

b)



$x + 4 = 18$

 = 14

- 2 There are some counters under the cup.



There are 10 counters in total.

- a) If  $c$  is the number of counters under the cup, explain why  
 $c + 6 = 10$

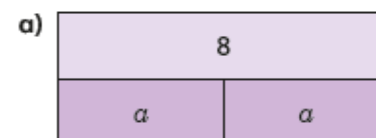
- b) Work out the value of  $c$ .

$c =$  4

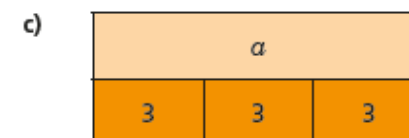
- c) How many counters are under the cup?

4

- 3 Write algebraic equations to represent the bar models.  
Find the value of  $a$  in each one.



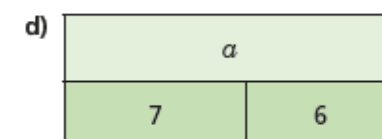
$a =$  4



$a =$  9



$a =$  5



$a =$  13

- 4 Nijah is solving the equation  $x - 8 = 20$

$x - 8 = 20$

$x = 20 - 8$

$x = 12$

What mistake has Nijah made?

She should have added 8 to 20

$x = 28$

5 Solve the equations.

a)  $x + 7 = 20$

$x = \boxed{13}$

b)  $10y = 80$

$y = \boxed{8}$

c)  $4m = 22$

$m = \boxed{5.5}$

d)  $g - 3 = 15$

$g = \boxed{18}$

e)  $32 = t - 5$

$t = \boxed{37}$

f)  $\frac{u}{6} = 3$

$u = \boxed{18}$

6 Filip thinks of a number.

He subtracts 5 from his number.

He ends up with 10

Write an algebraic equation to represent Filip's problem.

$x - 5 = 10$

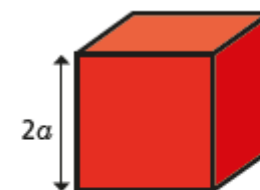
Solve the equation to work out his number.

$\boxed{15}$

7 Dexter builds a tower.

Each block is  $2a$  high.

He uses 7 blocks.



The total height of his tower is 42 cm.

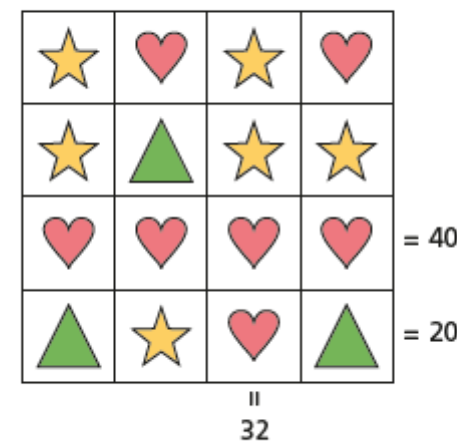
Write an equation to represent the height of Dexter's tower and find the value of  $a$ .

$14a = 42$

$a = \boxed{3}$  cm

8 Work out the value of each shape.

Write the equations that you solved to find the value of each shape.



Heart =  $\boxed{10}$

Star =  $\boxed{6}$

Triangle =  $\boxed{2}$

Work out the missing total of each row and column.

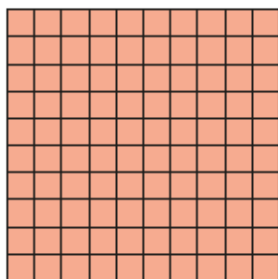
Compare answers with a partner.

# White Rose Answers (Year 5)

Monday

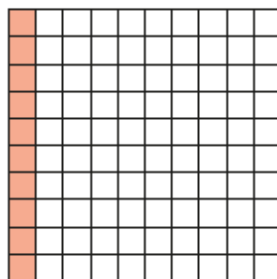
# Decimals as fractions (2)

1 This grid represents 1



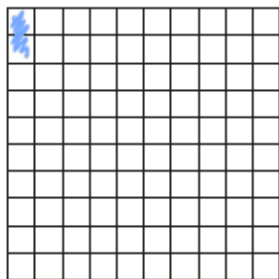
This grid represents 0.1 or

$$\frac{10}{100} \text{ or } \frac{1}{10}$$

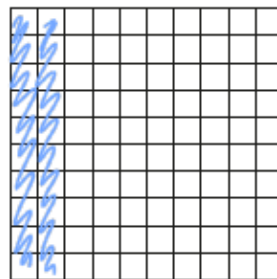


Colour the hundred squares to represent the fractions.

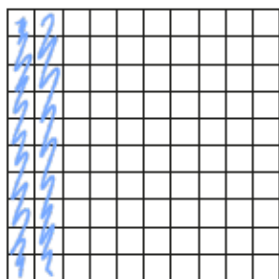
a)  $\frac{2}{100}$



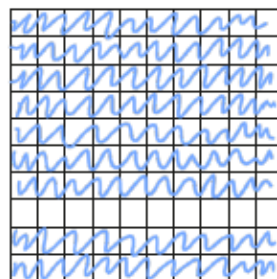
c)  $\frac{20}{100}$



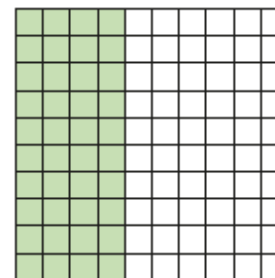
b)  $\frac{2}{10}$



d)  $\frac{90}{100}$



2 Complete the numbers to show how much of the square is shaded.



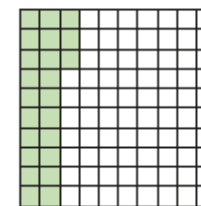
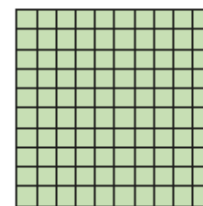
$$\frac{40}{100}$$

$$\frac{4}{10}$$

$$0.4$$

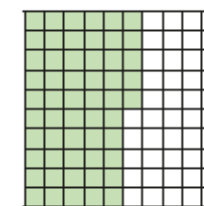
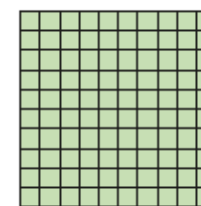
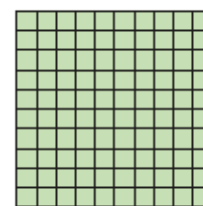
3 What fractions and decimals are represented?

a)



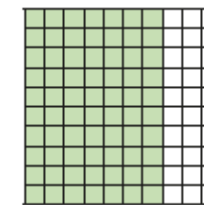
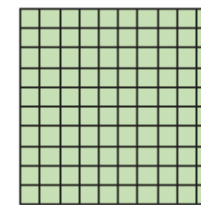
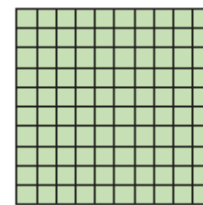
$$1 \frac{23}{100} = 1.23$$

b)



$$2 \frac{55}{100} = 2.55$$

c)

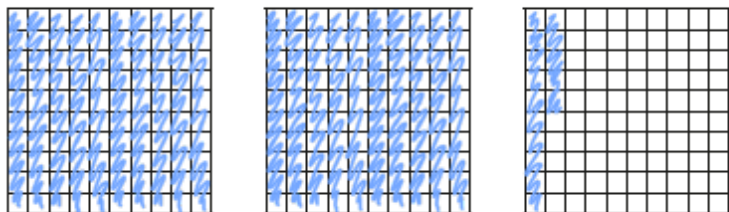
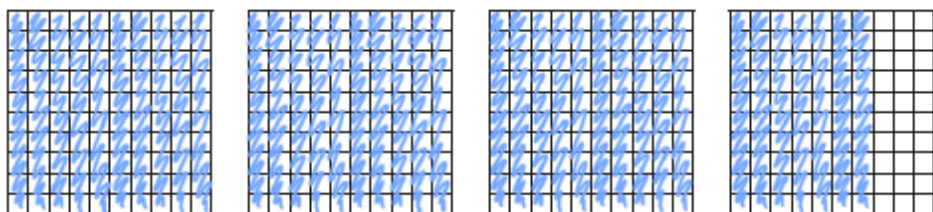


$$2 \frac{7}{10} = 2.7$$



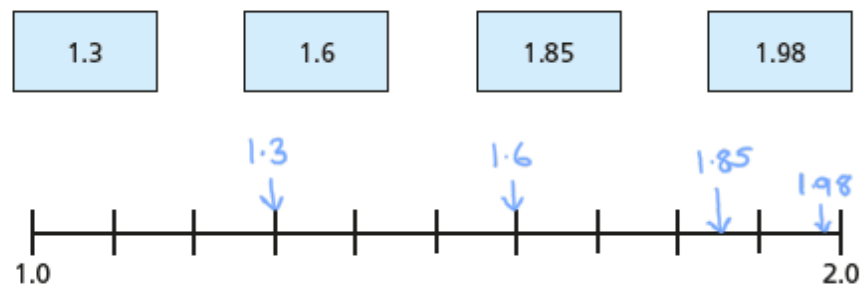
4

a) Represent 2.15

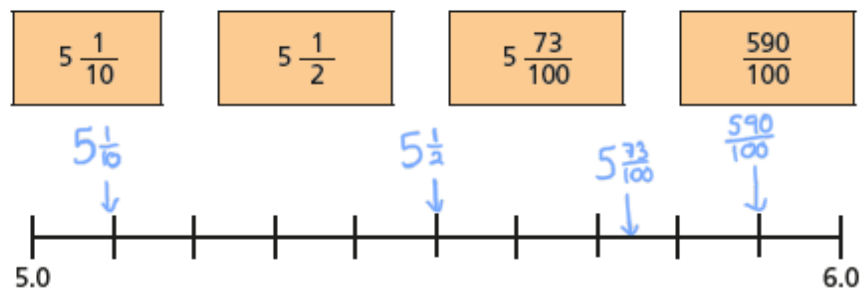
b) Represent  $3\frac{7}{10}$ 

5

a) Label the number line with the decimals.



b) Label the number line with the fractions.



6

Complete the table.

Decimal	Decimal (expanded form)	Fraction	Fraction (expanded form)	In words
2.13	$2 + 0.1 + 0.03$	$2\frac{13}{100}$	$2 + \frac{1}{10} + \frac{3}{100}$	2 ones, 1 tenth and 3 hundredths
4.37	$4 + 0.3 + 0.07$	$4\frac{37}{100}$	$4 + \frac{3}{10} + \frac{7}{100}$	4 ones, 3 tenths and 7 hundredths
5.62	$5 + 0.6 + 0.02$	$5\frac{62}{100}$	$5 + \frac{6}{10} + \frac{2}{100}$	5 ones, 6 tenths and 2 hundredths
8.02	$8 + 0.02$	$8\frac{2}{100}$	$8 + \frac{2}{100}$	8 ones and 2 hundredths

7

Write the decimals as fractions.

Give your answer as a mixed number.

a)  $32.6 = 32\frac{6}{10}$

c)  $13.08 = 13\frac{8}{100}$

b)  $2.03 = 2\frac{3}{100}$

d)  $3.98 = 3\frac{98}{100}$

8

Use the digits 3, 4 and 5 to complete the decimal number.

e.g.  $3\frac{4}{10} \cdot 0\frac{5}{10}$ 

How many different numbers can you make?

Tuesday

# Understand thousandths

1 Tommy is using base 10 to represent decimals.

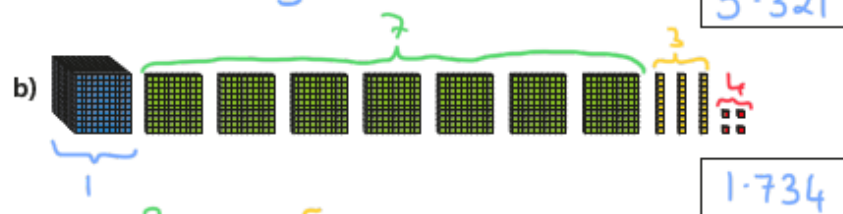
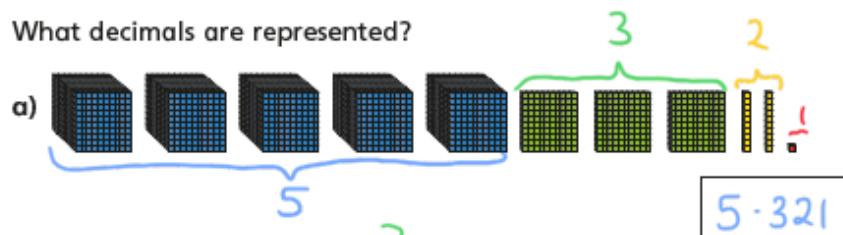
He uses  to represent 1 whole.

He uses  to represent  $\frac{1}{10}$  or 0.1

He uses  to represent  $\frac{1}{100}$  or 0.01

He uses  to represent  $\frac{1}{1000}$  or 0.001

What decimals are represented?



2 a) Represent each number using base 10

0.512

1.352

2.003

b) Use your representations to help you complete the statements.

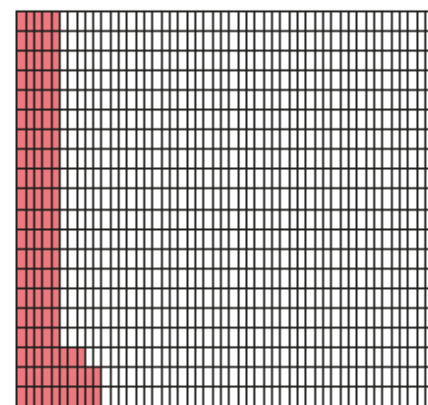
$$0.512 = 0.5 + 0.01 + \boxed{0.002}$$

$$1.352 = 1 + \boxed{0.3} + \boxed{0.05} + \boxed{0.002}$$

$$2.003 = \underline{2 + 0.003}$$

3 Here is a thousand square.

Part of the square has been coloured.



a) Why do you think it is called a thousand square?

It is split into one thousand equal parts.

b) What fraction of the square has been coloured?

$\frac{113}{1000}$

c) Write the fraction as a decimal.

0.113

4 What fraction of each square has been shaded?

Write each number as a fraction and as a decimal.

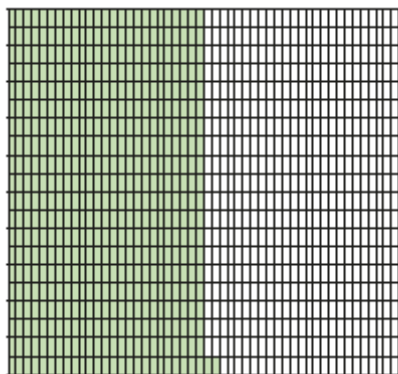
a)



fraction =  $\frac{371}{1000}$

decimal = 0.371

b)

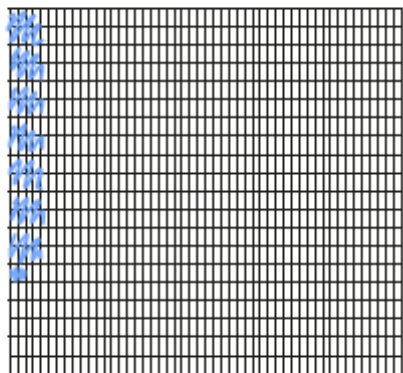


fraction =  $\frac{502}{1000}$

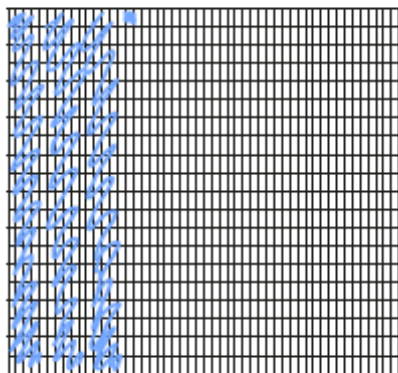
decimal = 0.502

5 Colour the grids to represent the fraction and decimal.

a)  $\frac{73}{1000}$



b) 0.302



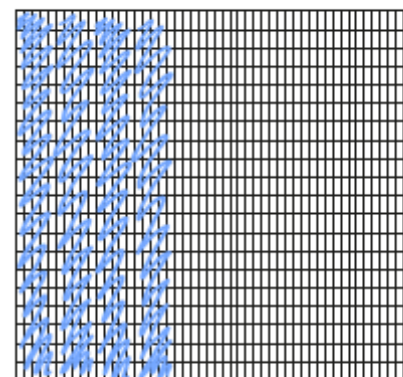
6 Represent these numbers on a place value chart.

a) 1.372

b) 0.091

c) 3.542

7 Show that  $\frac{400}{1000}$  is the same as 0.4



400 out of 1,000  
equal parts =  $\frac{400}{1000}$

4 out of 10 equal  
columns =  $\frac{4}{10} = 0.4$

8 Write the numbers represented by the place value charts.

a)

Ones	Tenths	Hundredths	Thousandths
1 1 1 1	0.1 0.1	0.01 0.01 0.01 0.01 0.01 0.01 0.01	0.001 0.001 0.001 0.001 0.001 0.001

4.276

b)

Ones	Tenths	Hundredths	Thousandths
	0.1 0.1 0.1 0.1 0.1		0.001 0.001 0.001 0.001

0.504

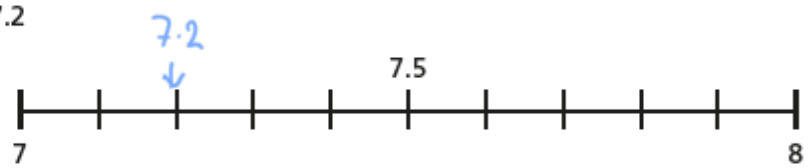
Wednesday

# Rounding decimals

1 Show the position of each number on the number line.  
Use the number line to round these decimals to the nearest whole number.

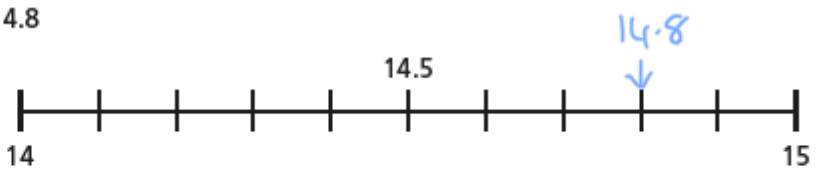


a) 7.2



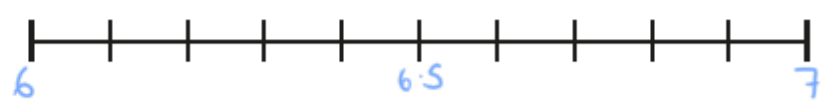
The nearest whole number is 7

b) 14.8



The nearest whole number is 15

c) 6.5



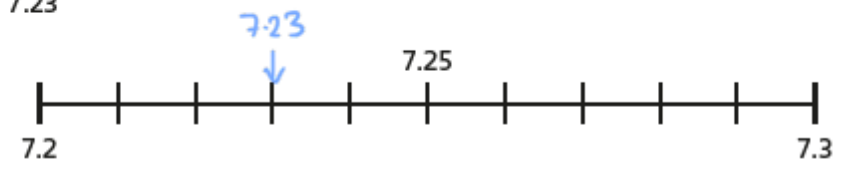
The nearest whole number is 7

Explain to a partner how to round decimal numbers to the nearest whole number.



2 Use the number line to round these decimal numbers to the nearest tenth and the nearest whole number.

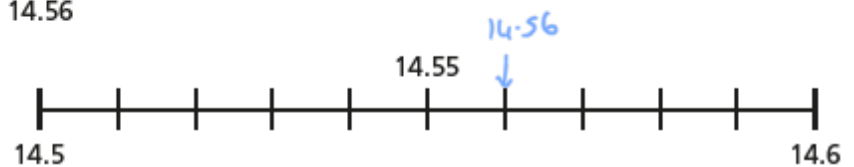
a) 7.23



The nearest tenth is 7.2

The nearest whole number is 7

b) 14.56



The nearest tenth is 14.6

The nearest whole number is 15

c) 6.45



The nearest tenth is 6.5

The nearest whole number is 6

Explain to a partner how to round decimal numbers to one decimal place.

- 3 a) When rounding to the nearest tenth, how many digits will there be after the decimal point?

1

- b) Round each number to one decimal place.

1.33 1.3

4.03 4.0

1.34 1.3

4.04 4.0

1.35 1.4

4.05 4.1

1.36 1.4

4.06 4.1

1.37 1.4

4.07 4.1

- 4 Round each number to the nearest tenth.

a) 4.21 4.2

d) 11.86 11.9

g) 12.92 12.9

b) 8.09 8.1

e) 5.67 5.7

h) 10.65 10.7

c) 4.84 4.8

f) 0.15 0.2

- 5 Circle each decimal that rounds to 6.2

6.32

6.23

6.27

6.17

6.12

6.25

Explain your reasoning.

They are greater than 6.15 but less than 6.25

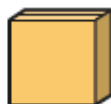
- 6 Here are the weights in kilograms of some parcels.



3.48 kg



1.42 kg



10.65 kg



1.03 kg

- a) Round the weight of each parcel to 1 decimal place.

3.5 kg

1.4 kg

10.7 kg

1.0 kg

- b) The weight of each parcel has been rounded to the nearest 100g.

Is this true or false? true

Talk about it with a partner.

- 7 Amir is thinking of a number.

Rounded to the nearest whole his number is 5

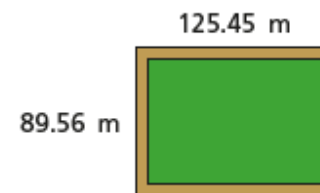
Rounded to the nearest tenth his number is 4.8

Write at least four different numbers that Amir could be thinking of.

e.g. 4.75, 4.79, 4.81, 4.84

- 8 A farmer is building a new fence for her sheep field.

Here are the measurements.



She wants to build a fence around the whole field.

Estimate how much fencing you think she will need.

$$125.5 + 89.6 + 125.5 + 89.6$$

$$= 251 + 179.2$$

430.2m

Talk about your estimate with a partner.

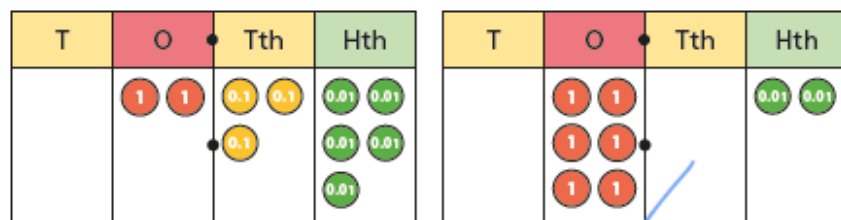
Thursday



# Order and compare decimals

1 Which number is greater?

Tick your answer.

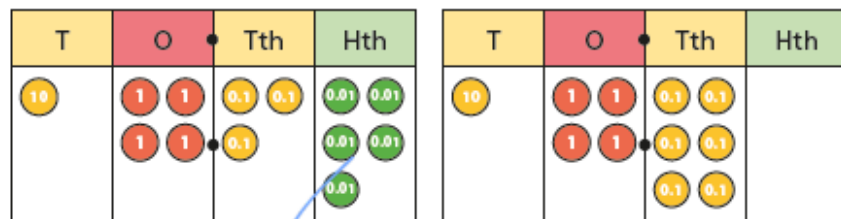


Explain your answer.

It has more ones.

2 Which is the smaller number?

Tick your answer.



Explain your answer.

It has fewer tenths.

3 Use place value counters to make each of the numbers.

4.13

4.08

5.1

a) Which is the greatest number?

5.1

b) Which is the smallest number?

4.08

How do you know?

4 Here are some numbers in a place value chart.

Ones	Tenths	Hundredths	Thousandths
3	2	3	4
3	1	6	
3	2	0	8
3	1	4	5

Write the numbers in order, starting with the greatest.






3.234

3.208

3.16

3.145

5 Mo, Amir, Ron, Teddy and Jack are measuring their heights with a metre rule.

Mo	Amir	Ron	Teddy	Jack
				
1.35 m	1.53 m	1.32 m	1.3 m	1.5 m

Write the names and heights of the children in order from shortest to tallest.

Name	Height
Teddy	1.3m
Ron	1.32m
Mo	1.35m
Jack	1.5m
Amir	1.52m

- 6 Alex and Dora are competing in the long jump.  
Alex jumps 1.35 metres and Dora jumps 1.4 metres.

Alex wins because 35  
is greater than 4



- a) Is Dora correct? No

Talk about it with a partner.



- b) Kim joins in the competition.

What is the shortest distance she can jump to go into the lead?

1.41m

- 7 Write the numbers in ascending order.

- a) 0.45      0.654      0.546      0.405

0.405

0.45

0.546

0.654

- b) 7.2 kg      7.212 kg      7.21 kg

7.2kg

7.21kg

7.212kg

- c) 25.391      25.309      25.093      25.193

25.093

25.193

25.309

25.391

- 8 Dexter is thinking of a number.



It is a decimal number  
with 2 decimal places that is  
greater than 2.47 but  
less than 2.58

What possible numbers could Dexter be thinking of?

2.48, 2.49, 2.50, 2.51, 2.52, 2.53, 2.54, 2.55, 2.56, 2.57

- 9 Tick the numbers that are equal to 2.5

Circle the numbers that are greater than 2.5

You will need to convert the mixed numbers to decimal numbers first.

2.05

$2\frac{5}{10}$

$2\frac{1}{2}$

$2\frac{5}{100}$

2.53

$2\frac{3}{5}$

2.501

$2\frac{80}{100}$

$2\frac{3}{10}$

Dip and Pick 19 Answers

James has read 625 out of the 1125 pages.

$$\frac{625}{1125} = \frac{25}{45} = \frac{5}{9}$$

He has  $\frac{4}{9}$  of the book left to read.

20 pages per day	30 pages per day	Total no of days
12	2	14
*3	8	11
6	6	12
*9	4	11

\*Two options of 11 days.

$$\frac{4}{9} = 96 \text{ pages.}$$

$$\frac{1}{9} = 24 \text{ pages.}$$

$$\frac{7}{9} = 7 \times 24 = 168 \text{ pages.}$$

One possible approach...

James increase the time he takes to read each page by 15%.

How does this affect the responses in the Green challenge?

$$\frac{4}{9} = 96 \text{ pages}$$
$$\frac{1}{9} = 24 \text{ pages}$$

$$\frac{7}{9} = 7 \times 24 = 168 \text{ pages}$$

$$168 \times 7 = 1176 \text{ mins}$$

$$1176 \div 60 = 19.6 \text{ hours}$$

$$1176 - 1140 (19 \text{ hrs}) = 36$$

It takes James 19 hrs and 36 mins to read the book.

$$\frac{4}{9} = 96 \text{ pages}$$
$$\frac{1}{9} = 24 \text{ pages}$$

$$\frac{7}{9} = 7 \times 24 = 168 \text{ pages}$$

$$168 \times 7 = 1176 \text{ mins}$$

$$1176 \div 60 = 19.6 \text{ hours}$$

$$1176 - 1140 = 36 (19 \text{ hrs})$$

It takes James 19 hrs and 36 mins to read the book.

$$168 \text{ pages} \times 2 \text{ mins} = 336 \text{ mins.}$$

$$1176 - 336 = 840 \text{ mins.}$$

Which is exactly 14 hours

James is incorrect. He needs an extra 2 hours to finish the book.

# Reading Answers

15.

600/six hundred

16.

The valley of death/ Rode the six hundred

17.

Someone had blundered

18.

Dismayed

19.

The soldiers' attitude was to follow any order given, even if they did not agree with them

The soldiers were not allowed to question the orders or disagree with them, they just had to do as they were told

The soldiers were willing to die for their country, following the orders or

They had to follow orders

20.

The soldiers were brave and rode well, even though they were likely to be killed.

Riding into the jaws of death tells us that the brigade were doomed but they still showed courage.

21.

Honour

22.

The brigade rode back but some men had been killed – 4

The soldiers all followed the order and rode forward – 2

The order was given to charge forward – 1

The enemy were waiting and shot at the soldiers – 3

23.

The soldiers were surrounded by cannons.

1.

69

2.

About 1 metre tall

3.

Passenger pigeon

West African black rhino

Tasmanian tiger

4.

The edge/ verge/ threshold

Nearly occurring

About to happen

5.

Black Rhino

Endangered

880

6. 1979

7.

Because it has not been seen in the wild for more than 25 years.

8.

Decreasing or decline

9.

Considerable efforts have gone into conservation

The animals have no natural predators

10.

Spread seeds/ encourage new growth

11.

Other species of animals live in the forest so they need it to keep growing

Without the pandas spreading bamboo seeds, the forests would not grow so well and it is the home of the other species

The forest is home to other animal species which rely on the pandas spreading the seeds to encourage new growth

12.

Bald eagle – once at risk of extinction but now recovering

Black rhino – killed for the illegal trade of their horn

Dodo – flightless bird, now extinct

13.

Plants and animals can be extremely important for the ecosystem of the Earth

Species depend on each other for survival

We want to be able to enjoy the beauty of nature

Once a species becomes extinct, it has gone forever

14.

Human causes are more likely as they include examples such as hunting or habitat destruction which have happened more recently.

Human causes because the text says ‘ in more modern times, the most common causes are from human intervention’

Or

Natural causes because governments have introduced new laws, such as in China in 1979, to reduce the decline of animals like the giant panda.

Natural causes because ‘increased conservation efforts’ have helped to save species such as the mountain gorilla, bald eagle or American alligator.