

# Reasoning and Problem Solving

## Step 1: Three Decimal Places

### National Curriculum Objectives:

Mathematics Year 6: (6F9a) [Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to three decimal places](#)

Mathematics Year 6: (6F10) [Solve problems which require answers to be rounded to specified degrees of accuracy](#)

### Differentiation:

Questions 1, 4 and 7 (Reasoning)

**Developing** Sort given numbers into a Carroll diagram. Explain empty values. Numbers with up to 2 decimal places. Problems do not include conversion.

**Expected** Sort given numbers into a Carroll diagram. Explain empty values. Numbers with 3 decimal places.

**Greater Depth** Sort given numbers into a Carroll diagram. Explain empty values. Numbers with 3 decimal places. Problems require conversion.

Questions 2, 5 and 8 (Problem Solving)

**Developing** Answer a riddle finding multiple possible answers. Numbers with up to 2 decimal places. Problems do not include conversion.

**Expected** Answer a riddle finding multiple possible answers. Numbers with 3 decimal places. Problems may require conversion.

**Greater Depth** Answer a riddle finding multiple possible answers. Numbers with 3 decimal places. Problems require conversion.

Questions 3, 6 and 9 (Reasoning)

**Developing** Find the odd one out from three numbers presented in word or digit form. Numbers with up to 2 decimal places. Problems do not include conversion.

**Expected** Find the odd one out from four numbers presented in word or digit form. Numbers with 3 decimal places. Problems may require conversion.

**Greater Depth** Find the odd ones out from six numbers presented in word or digit form. Numbers with 3 decimal places. Problems require conversion.

More [Year 6 Decimals](#) resources.

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## Three Decimal Places

1a. Sort the numbers into the table.

2.51

2.05

2.91

2.11

> 2.5

< 2.5

value > 2 in  
hundredths column

value < 2 in  
hundredths column

Are there any empty boxes?  
Explain why.



R

## Three Decimal Places

1b. Sort the numbers into the table.

0.99

1.09

10.01

1.19

> 1

< 1

value > 8 in  
hundredths column

value < 8 in  
hundredths column

Are there any empty boxes?  
Explain why.



R

2a. Barney is thinking of a number.



My number has  
2 decimal places.

The hundredths value is  
< 2.

It is a number between  
4.56 and 5.03

What could Barney's number be?  
Find four possibilities.



PS

2b. Jessica is thinking of a number.



My number is between  
20 and 21 and it has 2  
decimal places.

The tenths digit is larger  
than the hundredths.

The hundredths digit is >  
3.

What could Jessica's number be?  
Find four possibilities.



PS

3a. Which is the odd one out?

A

Five ones,  
two tenths  
and five  
hundredths

B

Five point  
five two

C

5.25

Give the number in digits and explain  
your answer.



R

3b. Which is the odd one out?

A

24.07

B

Twenty  
four and  
seven  
tens

C

Twenty  
four point  
zero  
seven

Give the number in digits and explain  
your answer.



R

## Three Decimal Places

4a. Sort the numbers into the table.

1.901

1.665

1.799

1.909

> 1.856

< 1.856

value > 8 in  
tenths column

value < 8 in  
tenths column

Are there any empty boxes?  
Explain why.



R

## Three Decimal Places

4b. Sort the numbers into the table.

9.609

8.655

9.906

8.609

> 8.7

< 8.7

value > 7 in  
tenths column

< 70 hundredths

Are there any empty boxes?  
Explain why.



R

5a. Ollie is thinking of a number.



My number has  
3 decimal places.

The hundredths digit is > 4.

It is between 2.87 and  
2.843

The thousandths digit is  
greater than the ones digit.

What could Ollie's number be?  
Find eight possibilities.



PS

5b. Abbie is thinking of a number.



My number has  
3 decimal places.

The hundredths column  
has a zero value.

My number is between  
5.939 and 5.838.

What could Abbie's number be?  
Find eight possibilities.



PS

6a. Which is the odd one out?

A

7 ones, 3  
hundredths and  
9 thousandths

B

seven ones and  
three hundredths  
and nine  
thousandths

C

Seven point  
zero three nine

D

7,039

Give the number in digits and explain  
your answer.



R

6b. Which is the odd one out?

A

Two tens, four  
hundredths and  
seven  
thousandths

B

Twenty point  
zero,4,7

C

Twenty plus  
forty seven  
thousandths

D

20.47

Give the number in digits and explain  
your answer.



R

## Three Decimal Places

7a. Sort the numbers into the table.

5.057

5.073

5.9

5.007

> 5.069

< 5.069

Number > 504  
hundredths

Number < 5,040  
thousandths

Are there any empty boxes?  
Explain why.



R

## Three Decimal Places

7b. Sort the numbers into the table.

0.787

0.599

0.955

0.588

> 0.679

< 0.679

Number > 60  
hundredths

Number <  
600 thousandths

Are there any empty boxes?  
Explain why.



R

8a. Mairi is thinking of a number.

My number has  
3 decimal places.

It has more than 70  
hundredths.

It is between 9 and 8.843

The thousandth digit is  
greater than the ones digit.



What could Mairi's number be?  
Find ten possibilities.



PS

8b. Hakeem is thinking of a number.

My number has  
1 decimal place.

It has more than 20  
hundredths.

It is between  
8.035 and 10.536



What could Hakeem's number be?  
Find ten possibilities.



PS

9a. Which is the odd one out?

A

45 tenths and  
29 thousandths

B

4 point 5, 2, 9

C

Forty five point  
2, 9

D

4.529

Give the number in digits and explain  
your answer.



R

9b. Which is the odd one out?

A

23.054

B

Twenty three  
point five four

C

Two tens, three  
ones, five  
hundredths and  
four thousandths

D

Two hundred  
and thirty tenths  
and fifty four  
thousandths

Give the number in digits and explain  
your answer.



R

## Reasoning and Problem Solving Three Decimal Places

### Developing

1a.

	2.05
2.51, 2.91	2.11

One box is empty as none of the numbers are greater than 2.5 with a value greater than 2 in the hundredths column.

2a. Various answers, for example:

4.61, 4.71, 4.81, 4.91, 5.01

3a. B: 5.52; the others describe 5.25.

### Expected

4a.

1.901, 1.909	
	1.665, 1.799

Two boxes are empty because none of the numbers that are  $> 1.856$  have a value of  $< 8$  in the tenths column, and none that are  $< 1.856$  have a value of  $> 8$  in the tenths column.

5a. Various answers, for example:

2.853, 2.854, 2.855, 2.856, 2.857, 2.858, 2.859, 2.863, 2.864, 2.865, 2.866, 2.867

6a. D: 7.039; the others describe 7.039

### Greater Depth

7a.

5.073, 5.9	5.057
	5.007

There is one empty box because no numbers can be  $> 5.069$  if they have less than 5,040 thousandths (5.04).

8a. Various answers, for example:

8.849, 8.859, 8.869, 8.879, 8.889, 8.899, 8.949, 8.959, 8.969, 8.979, 8.989, 8.999

9a. C: 45.29; the others describe 4.529

## Reasoning and Problem Solving Three Decimal Places

### Developing

1b.

1.09, 1.19	0.99
10.01	

One box is empty as none of the numbers are less than 1 with a value less than 8 in the hundredths.

2b. Various answers, for example:

20.54, 20.64, 20.74, 20.84, 20.94, 20.65, 20.75, 20.85, 20.95, 20.76, 20.86, 20.96,

3b. B: 24.7; the others describe 24.07.

### Expected

4b.

9.906	
9.609	8.665, 8.609

One box is empty because none of the numbers that are  $< 8.7$  have a value of  $> 7$  in the tenths column.

5b. Various answers, for example:

5.901, 5.902, 5.903, 5.904, 5.905, 5.906, 5.907, 5.908, 5.909

6b. D: 20.47; the others describe 20.047

### Greater Depth

7b.

0.787, 0.955	
	0.588, 0.599

There are two empty boxes because no numbers can be  $< 0.679$ , if they have more than 60 hundredths (0.6). Nor can they be  $> 0.679$  if they have less than 600 thousandths (0.6).

8b. Various answers, for example:

8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8, 9.9, 10.3, 10.4, 10.5

9b. B: 23.54; the others describe 23.054