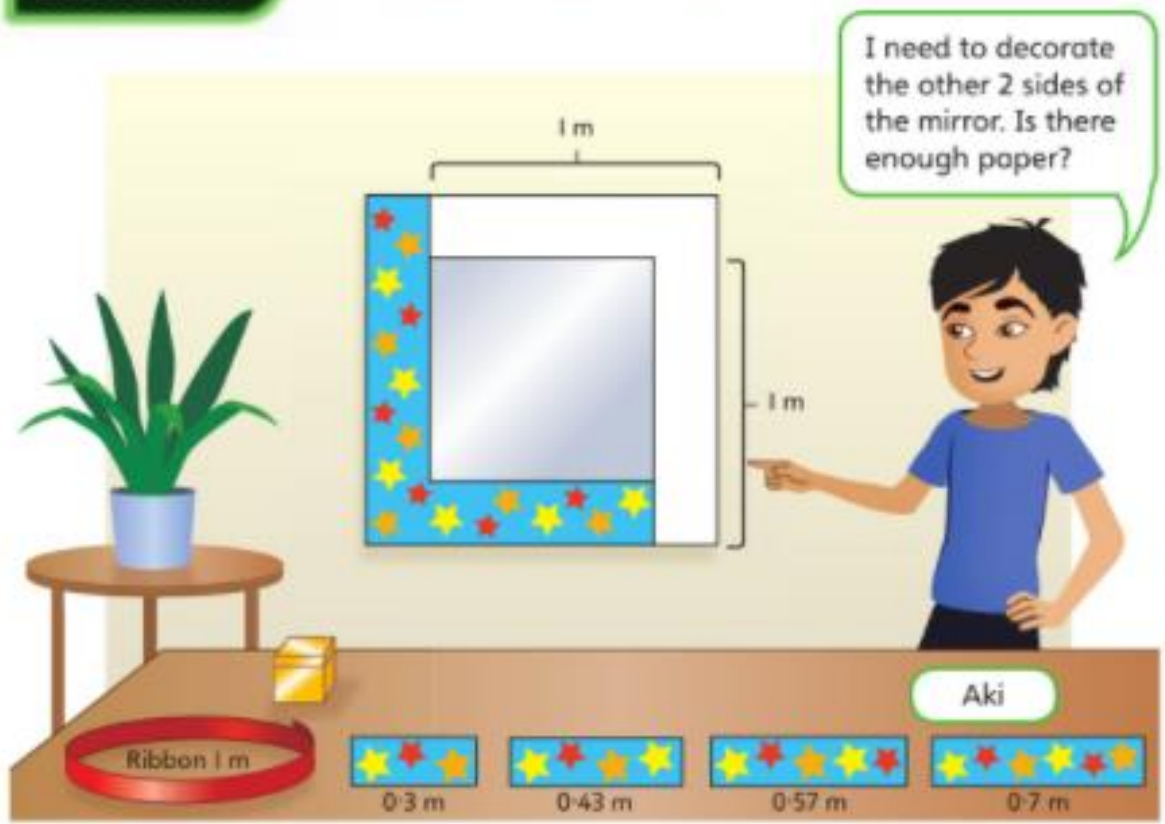
# Adding and subtracting decimals 3

## Discover




**1** a) How can Aki use the paper to decorate the other two sides of the mirror?

b) Aki bought 1 m of ribbon. He used 0·235 m to go around the outside of his treasure box.

How much ribbon does Aki have left?

Good Morning Year 5! Welcome to Thursday's lesson on adding and subtracting decimals.

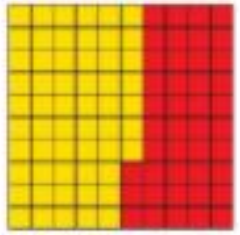
Just like normal have a go for a few minutes at the questions before we look at how to work them out on the next slide. Please remember to show your working out and the questions on some paper so that you can bring them into school and show Miss Bosworth when we are back in class.

## Share

a) Aki has two 1 m sides of mirror to cover. He needs to find paper pieces that make 1 m.

0·7 + 0·3 = 1

| O | · | Tth |
|---|---|---|
| 0 | · | 7 |
| + 0 | · | 3 |
| 1 | · | 0 |



0·57 + 0·43 = 1

| O | · | Tth | Hth |
|---|---|---|---|
| 0 | · | 5 | 7 |
| + 0 | · | 4 | 3 |
| 1 | · | 0 | 0 |

I remember! On a hundredths grid, 1 column is equal to 1 tenth (0·1) or 10 hundredths (0·10).

I used number bonds to 10 and 100 to work out which ones added to one whole.

Aki can use the 0·7 m and 0·3 m pieces to decorate one side of the mirror and 0·57 m and 0·43 m to decorate the other side.

b) We need to do a subtraction to work how much ribbon Aki has left.

I used number bonds to 1,000 to check my answer.

235 + 765 = 1,000

1 m ribbon

| 0·765 m | 0·235 m |
|---|---|

Write 1 as 1·000 and subtract 0·235.

| O | · | Tth | Hth | THth |
|---|---|---|---|---|
| ⁰1 | · | ⁹0 | ⁹0 | ¹0 |
| − 0 | · | 2 | 3 | 5 |
| 0 | · | 7 | 6 | 5 |

Aki has 0·765 m of ribbon left.



The two missing sides of the mirror are both 1m. So he needs to find some paper that = 1m. The sizes of paper that he has are 0.3, 0.43. 0.57 and 0.7.

0.7 + 0.3 = 1

| O | · | Tth |
|---|---|---|
| 0 | · | 7 |
| + 0 | · | 3 |
| 1 | · | 0 |

0.53 + 0.47 = 1

| O | · | Tth | Hth |
|---|---|---|---|
| 0 | · | 5 | 7 |
| + 0 | · | 4 | 3 |
| 1 | · | 0 | 0 |

This means that Aki can use the 0.7m and 0.3m pieces to decorate one side of the mirror and the 0.57 and 0.43m pieces to decorate the other side.

To work out how much ribbon Aki has left we need to do 1m – 0.235m. I need to make sure I set up my columns correctly and can put in zeros to make it easier.

| O | · | Tth | Hth | THth |
|---|---|---|---|---|
| ⁰1 | · | ⁹0 | ⁹0 | ¹0 |
| − 0 | · | 2 | 3 | 5 |
| 0 | · | 7 | 6 | 5 |

Remember to exchange correctly and make it really clear. Look at the crossing out of numbers and the clear new number written in its place.

## Think together

**1** These pieces of decorative paper have been cut from 1 m strips of paper.

Find the amount left from each strip.

a) 0·4 m

1 m − ☐ m = ☐ m

b) 0·49 m

1 m − ☐ m = ☐ m

c) 0·68 m

1 m − ☐ m = ☐ m

To work out 1a I will use subtraction. 1 – 0.4

I will set it out like this

$$\begin{array}{r} 0\ \ 1\ \ 10 \\ -\ \ 0\ .\ 4 \\ \hline 0\ .\ 6 \end{array}$$

I start in my Tth column and I can not do 0-4 so I exchange and my in the Ones column becomes a 0 and I now have 10 in my Tth column. 10 – 4 = 6. and 0 – 0 = 0 so my answer is 0.6

1b) 1 – 0.49. Make sure you set it out correctly and write in the zeros for the number 1.

$$\begin{array}{r} 9\ \ 10\ \ 10 \\ -\ \ 1\ .\ 0\ \ 0 \\ \hline 0\ .\ 4\ \ 9 \\ \hline 0\ .\ 5\ \ 1 \end{array}$$

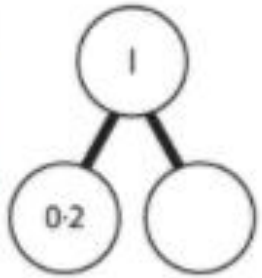
So I would start with the Hth column and so 0 – 9 which you can't do. This means I will need to exchange. I can not exchange from the Tth column so need to exchange from the Ones column. The 1 becomes a 0 in the ones column and the 0 becomes 10 in the Tth column. But I still need to exchange so the 10 now becomes 9 in the Tth column and there is now 10 in the Hth column. I can now do my subtraction. 10 – 9 = 1 in the Hth column. 9 – 4 = 5 in the Tth column and 0 – 0 = 0 in the ones column. Which means my answer is 0.51.

1c) 1.00 – 0.68. I will make sure I set it up correctly and I do my exchanging clearly.

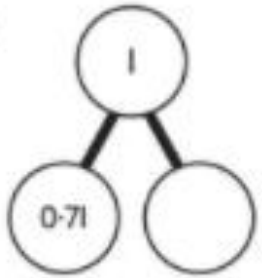
$$\begin{array}{r} 9 \\ 1\ .\ 10\ \ 10 \\ -\ \ 0\ .\ 6\ \ 8 \\ \hline 0\ .\ 3\ \ 2 \end{array}$$

**2** Write the missing numbers.

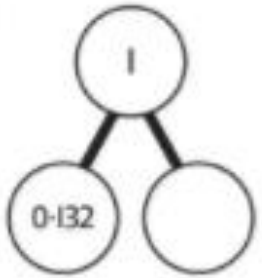
a)




b)




c)




I know these are part whole models and I know that the whole for each of these models is the number 1. This means I need to do 1 – whatever is in the part to get the answer for the other part.

$$\begin{array}{r} 0\,\not{1}\,.\,{}^{1}0 \\ -\;\;0\;.\;\;2 \\ \hline 0\;.\;\;8 \\ \hline \end{array}$$

2a) Starting in the Tth column and doing the exchanging my answer is 0.8. 0.8 + 0.2 makes the whole number 1

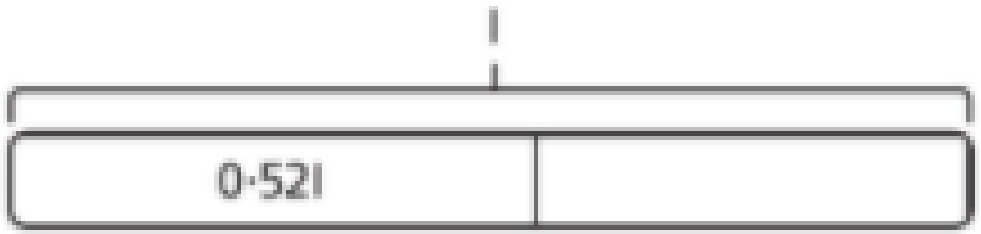
2b) Set up the columns and start with the Hth can't do that so do the exchanging.

$$\begin{array}{r} \not{1}\,.\,{}^{9}\not{0}\,{}^{10}0 \\ -\;\;0\;.\;\;7\;\;1 \\ \hline 0\;.\;\;2\;\;9 \\ \hline \end{array}$$

2c) 1.000 – 0.132. As long as I set the columns up correctly and ensure I am exchanging clearly I should get the correct answer. This time I will start my subtraction by looking at the Thousandths column.

$$\begin{array}{r} 0\,\not{1}\,.\,{}^{9}\not{0}\,{}^{9}\not{10}\,{}^{10}0 \\ -\;\;0\;.\;\;1\;\;3\;\;2 \\ \hline 0\;.\;\;8\;\;6\;\;8 \\ \hline \end{array}$$

d)




I will do the number 1 – 0.521 to work out the missing part to the bar model. To make it easier I will write the number 1 as 1.000

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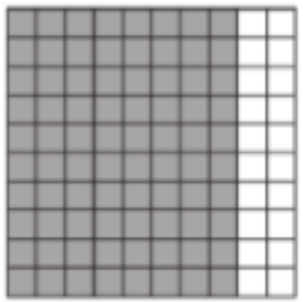
Starting in the Thousandth column I can't do it so I need to exchange and can only exchange from the ones column. This means there are now 0 ones and 10 tenths so I need to exchange again so now 9 tenths and 0 hundredths but I need to exchange again so now 9 hundredths and 10 thousandths. I can now do my subtraction. 10 thousandths – 1 thousandth = 9. 9 hundredths – 2 hundredths = 7 hundredths. 9 tenths – 5 tenths = 4 tenths and 0 ones – 0 ones = 0. so my answer is 0.479

$$\begin{array}{r} {\scriptstyle 0}\quad {\scriptstyle 9}\;{\scriptstyle 9}\;{\scriptstyle 1}\;{\scriptstyle 0} \\ 1.\,0\,0\,0 \\ -\;\;0.\,5\,2\,1 \\ \hline 0.\,4\,7\,9 \end{array}$$

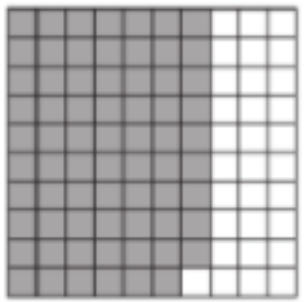
# Adding and subtracting decimals 3

**1** Use the hundredths grids to help you find the missing numbers.

a) 0·8 + ☐ = 1



b) 0·69 + ☐ = 1



**2** Draw lines to match the pairs that make 1 m when added together.

You may not be able to find a pair for all of the pieces.

0·76 m

0·88 m

0·12 m

0·234 m

0·55 m

0·34 m

0·332 m

0·1 m

0·9 m

0·766 m

0·777 m

Now it is your turn. Don't forget to use paper to show your working out so that you can show Miss Bosworth all your hard work when we are back in the classroom.

Remember what we know about hundred squares that one row is one tenth and one tenth is 0.1

**3** Lexi has made a number on a place value grid.

| O | • | Tth | Hth |
|---|---|---|---|
| | • | (0.1) (0.1) | (0.01) (0.01) (0.01) (0.01) (0.01) (0.01) |

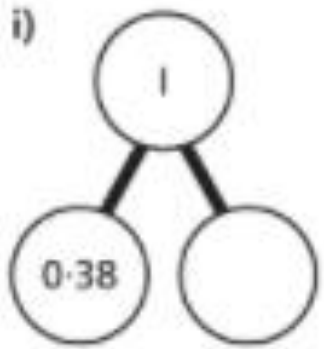

What mistake has Lexi made?

What counters does she need to add?

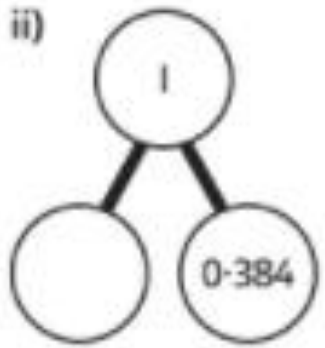
Think about exchanging and how many counters we can have in a column.

**4** a) Find the missing numbers.

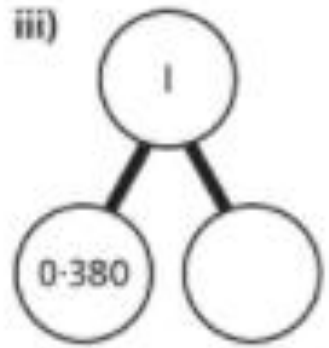
i)




ii)




iii)




Remember to set up your columns correctly for the subtraction and write in those zeros after the decimal place for the number one. Remember to keep your exchanging nice and clear so you do not get confused.

**5** Complete the following.

a) $0.3 + \square = 1$

b) $0.71 + \square = 1$

c) $\square + 0.05 = 1$

d) $0.90 + \square = 1$

e) $\square + 0.787 = 1$

f) $0.912 + \square = 1$

g) $1 - 0.24 = \square$

h) $1 - \square = 0.07$

i) $1 - 0.235 = \square$

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Make sure your columns are set up correctly when you do your working out and make sure if you need to exchange you write new numbers clearly so you do not get confused.

**6** Work out the missing numbers.

a) $0{\cdot}4 + \square = 1$

$0{\cdot}04 + \square = 1$

$0{\cdot}004 + \square = 1$

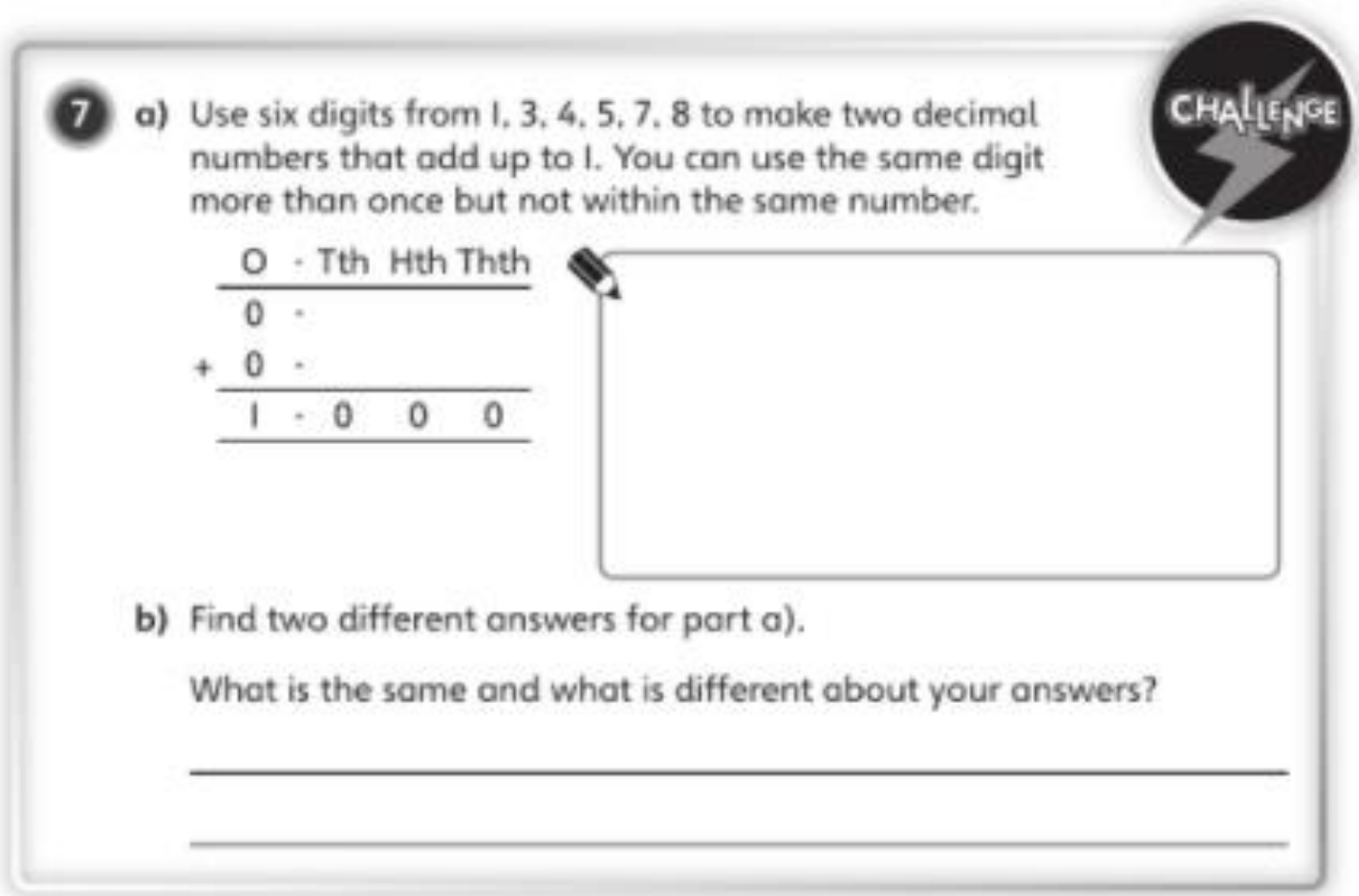
b) $0{\cdot}4 + \square = 1$

$0{\cdot}40 + \square = 1$

$0{\cdot}400 + \square = 1$

Make sure your columns are set up correctly when you do your working out and make sure if you need to exchange you write new numbers clearly so you do not get confused.

Is there a pattern here?




Here is the challenge slide for those of you who want to do a challenge. Like always if you found this lesson tricky or do not have much time left go on to the next slide and do the reflect.

## Reflect

Andy says, '0·207 + 0·793 = 1.' Do you agree? Explain your answer.

Well done for your continued hard work year 5. Make sure you keep all your work to show Miss Bosworth when we are back in the classroom. I hope you enjoy the rest of your day and I can't wait to see all your hard work.