White Rose Maths

Summer - Block 1

Decimals

Overview

Small Steps

1. Bonds to 10 and 100 (R)
2. Make a whole
3. Write decimals
4. Compare decimals
5. Order decimals
6. Round decimals
7. Halves and quarters

Notes for 2020/21

Whilst the majority of learning in this block will be new for all children, fluency in number bonds to both 10 and 100 will support children with their understanding of decimals so time should be spent recapping these.

Bonds to 100 (Tens)

Notes and Guidance

Teachers should focus at this stage on multiples of 10 up to and within 100

Links should be made again between single digit bonds and tens bonds.

Using a 10 frame to represent 100 would be a useful resource to make this link.

Mathematical Talk

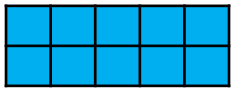
What does this represent?

Why is it different to a normal 10 frame?

Varied Fluency

R

- Match the 10 frames to the sentences below:



One hundred equals eighty plus twenty

$100 = 100 + 0$

$40 + 60 = 100$

- Fill in the missing numbers

$2 + 6 = 8$

$20 + 60 = \_\_\_\_\_$

$2\_\_ + \_\_0 = 80$

$80 = \_\_0 + 6\_\_$

- Continue the pattern

$90 = 100 - 10$
$80 = 100 - 20$

Can you make up a similar pattern starting with the numbers 60, 30 and 90?

Bonds to 100 (Tens)

Reasoning and Problem Solving

R

Sara thinks there are 10 different number bonds to 90 using multiples of 10
Beth thinks there are only 5

Who is correct?

Can you help the person who is wrong to understand their mistake?

Beth because 0 + 90 is the same as 90 + 0
Sara has repeated her answers the other way round.

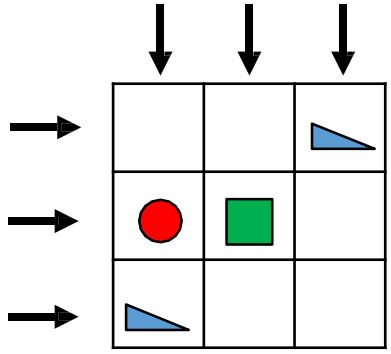
Using multiples of 10, how many number bonds are there for the following numbers?

20 30 40 50

What do you notice about the amount of bonds for each number?

If 80 has 5 bonds, predict how many 90 would have.

20 and 30 both have 2.
40 and 50 both have 3.
When the tens digit is odd it has the same number of bonds as the previous tens number. 90 would also have 5.

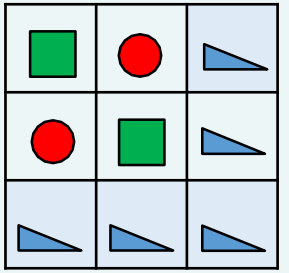


Squares are worth 10
Triangles are worth 20
Circles are worth 30

Can you complete the grid above so that all horizontal and vertical lines equal 60?

Can children create another pattern on an empty grid where each line equals 60?
How many possible ways are there to solve this?

Solution



Lots of possible solutions available.

Bonds to 100 (Tens and Ones)

Notes and Guidance

Here children build on their earlier work of number bonds to 100 with tens and number bonds to 10 and 20

They use their new knowledge of exchange to find number bonds to 100 with tens and ones.

Mathematical Talk

How many more do we need to make 100?

How many tens are in 100?

If I have 35, do I need 7 tens and 5 ones to make 100? Explain why.

Can you make the number using Base 10?
Can you add more Base 10 to the number to make 100?

Varied Fluency

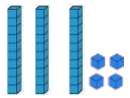
R

Use a 100 square.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

- 40 squares are shaded, how many are not shaded?
- 45 squares are shaded, how many are not shaded?
- 54 squares are shaded, how many are not shaded?

Hamza is making 100 with Base 10
How much more does he need if he has:

- 
- 5 tens and 3 ones
- 37

Children could place their Base 10 on top of a 100 piece to help them calculate.

$25 + \_\_\_ = 100$

$\_\_\_ + 69 = 100$

$100 - 84 = \_\_\_$

$100 - \_\_\_ = 11$

Bonds to 100 (Tens and Ones)

Reasoning and Problem Solving

R

Chris has completed the missing number sentence.

$$46 + 64 = 100$$

Is Chris correct?
Explain your answer.

Chris is incorrect. He has seen number bonds to 10 but forgotten that he would need to exchange ten ones for one ten.

Complete the pattern.

$$15 + 85 = 100$$
$$20 + 80 = 100$$
$$25 + 75 = 100$$
$$30 + \_\_ = 100$$
$$\_\_ + \_\_ = 100$$

Can you explain the pattern?

$$30 + 70 = 100$$
$$35 + 65 = 100$$

The first numbers are going up in fives and the second numbers are going down in fives. All of the number sentences are number bonds to 100

Each row and column adds up to 100.

Complete the grid.

45	45	
	35	
15		65

45	45	10
40	35	25
15	20	65

Make a Whole

Notes and Guidance

Children make a whole from any number of tenths and hundredths.
They use their number bonds to ten and one hundred to support their calculations. Children use pictorial and concrete representations to support their understanding.

Mathematical Talk

How many tenths make one whole?

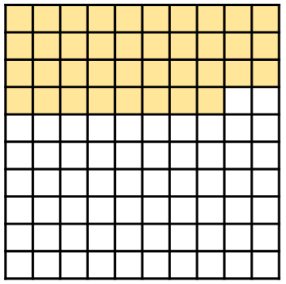
How many hundredths make one tenth?

How many hundredths make one whole?

If I have ___ hundredths, how many more do I need to make one whole?

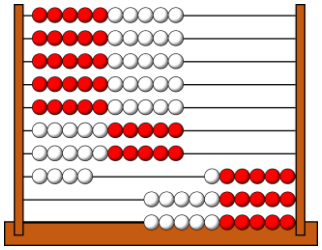
Varied Fluency

- Here is a hundred square.
How many hundredths are shaded?
How many more hundredths do you need to shade so the whole hundred square is shaded?



___ hundredths + ___ hundredths = 1 whole

- Here is a rekenrek with 100 beads.
Each bead is one hundredth of the whole.

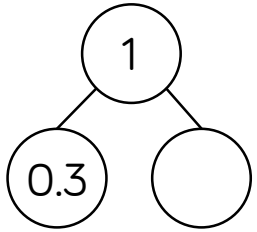


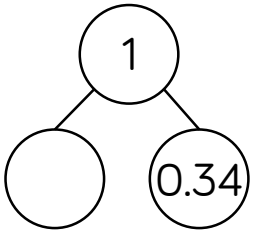
____ hundredths are on the left.

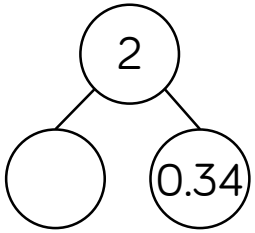
____ hundredths are on the right.

0.____ + 0.____ = 1

- Complete the part-whole models.



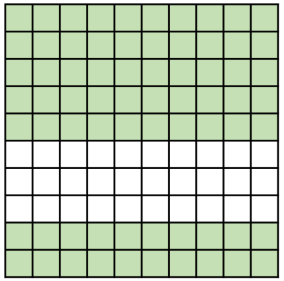


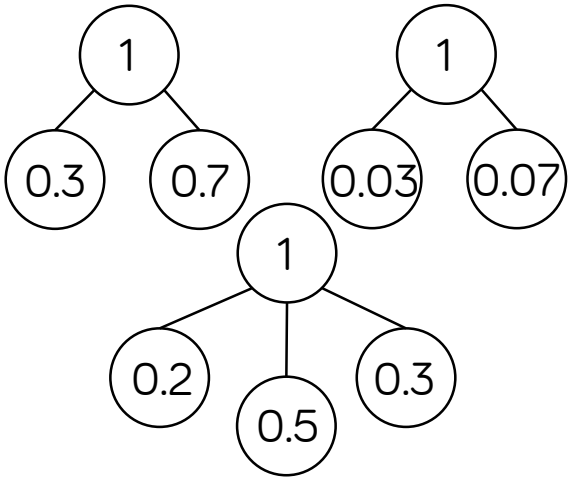


Make a Whole

Reasoning and Problem Solving

Which part-whole model does not match the hundred square?





Explain your answer.

0.03 + 0.07 does not equal one whole so this one does not match.

Three bead strings are 0.84 m long altogether.

Would four bead strings be longer or shorter than a metre?

Explain how you know.

Longer because each bead string is 28 cm (0.28 m) long, and 0.84 + 0.28 = 1.12 which is greater than 1 metre.

Write Decimals

Notes and Guidance

Children use place value counters and a place value grid to make numbers with up to two decimal places.
They read and write numbers with decimals and understand the value of each digit.
They show their understanding of place value by partitioning numbers with decimals in different ways.

Mathematical Talk

How many ones/tenths/hundredths are in the number?
How do we write this as a decimal? Why?
What is the value of the ____ in the number _____?
When do we need to use zero as a place holder?
How can we partition decimal numbers in different ways?

Varied Fluency

- What number is represented on the place value grid?

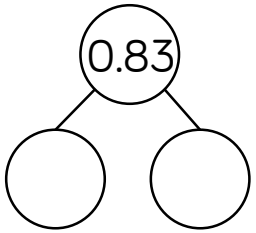
Ones	Tenths	Hundredths
	●	● ● ●
0	1	3

There are ____ ones,
____ tenths and
____ hundredths.
The number is ____

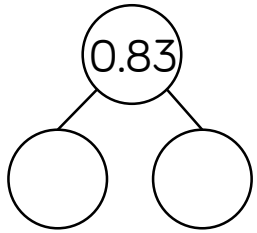
- Make the numbers on a place value chart and write down the value of the underlined digit.

3.47 2.15 0.6 25.03

- Complete the part-whole model in two different ways and write a number sentence to go with each.



0.83 = ____ + 0.03

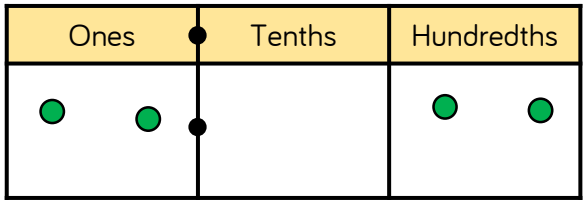


0.83 = 0.7 + ____

Write Decimals

Reasoning and Problem Solving

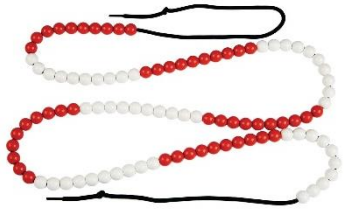
Annie thinks the number shown is 2.2



Do you agree with Annie?
Explain your answer.

No because Annie has not included the place holder. The number shown is 2.02

Mo is told that this bead string represents one whole.



He thinks that each individual bead represents one tenth.
Do you agree with Mo?
Explain your answer.

Mo is incorrect because there are 100 beads altogether on the bead string. Each individual bead is worth one hundredth.

Match each description to the correct number.

Teddy: My number has the same amount of tens as tenths.

Amir: My number has one decimal place.

Rosie: My number has two hundredths.

Eva: My number has six tenths.

46.2	2.64	46.02	40.46

Teddy: 40.46

Amir: 46.2

Rosie: 46.02

Eva: 2.64

Compare Decimals

Notes and Guidance

Children apply their understanding of place value to compare numbers with decimals with up to two decimal places.
They will consolidate and deepen their understanding of 0 as a place holder when making a comparison.

Mathematical Talk

How many tenths does it have?

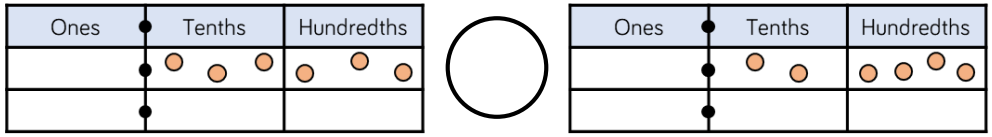
There are ___ tenths and ___ hundredths.

The number is ___ . ___ ___

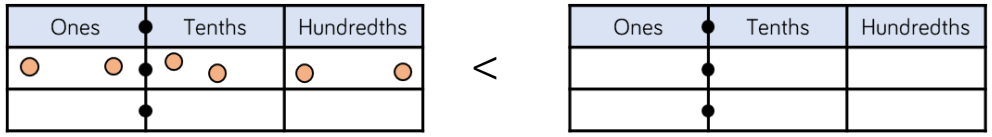
___ . ___ ___ is greater/less than ___ . ___ ___ because ...

Varied Fluency

Write the numbers shown and compare using < or >



Draw counters in the place value chart to make the statement correct.



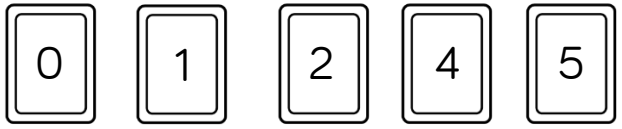
Complete.

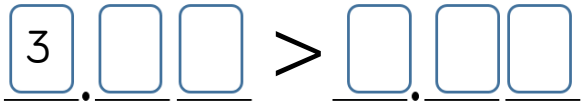
5.5	◯	5.7	0.37	<	0.__7
0.14	◯	0.29	2.22	>	2.__2
1	◯	0.64	1.__1	>	1.__1
3.32	◯	3.23	9.9__	<	9.9__

Compare Decimals

Reasoning and Problem Solving

Use each digit card **once** to make the statement correct.

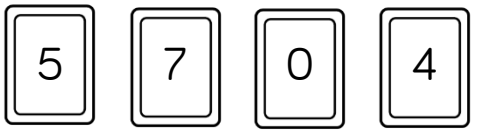




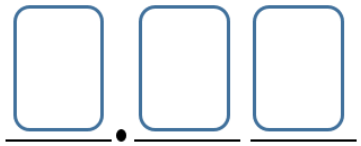
Can you find eight different possible solutions?

Some possible solutions:

3.12 > 0.45
3.24 > 1.05
3.45 > 1.02
3.01 > 2.45
3.42 > 2.01
3.45 > 0.12
3.02 > 1.45
3.24 > 1.05



Use three digit cards to make the greatest possible number.



Use three digit cards to make the smallest possible number.

The greatest:

7.54

The smallest:

0.45

Order Decimals

Notes and Guidance

Children apply their understanding of place value to order numbers with decimals with up to two decimal places.
They will consolidate and deepen their understanding of 0 as a place holder, the inequality symbols and language such as ascending and descending.

Mathematical Talk

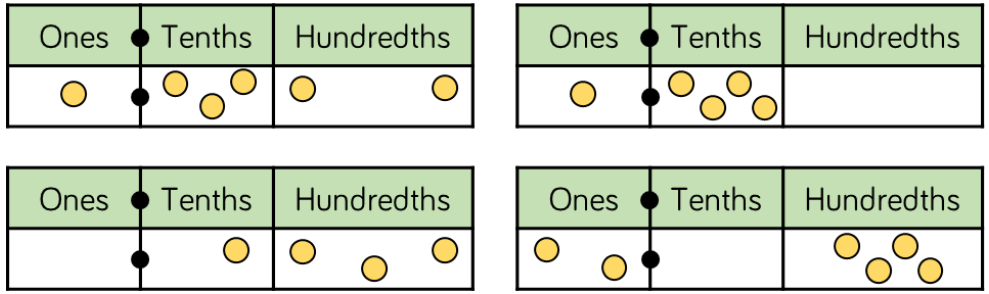
Which digit can we use to compare these decimals? Will this always be the case?

Do we always use the digit furthest left to compare decimals?

___ . ___ ___ is _____ than ___ . ___ ___ because ...

Varied Fluency

Write down the decimals represented in the place value grid and then place them in ascending order.



Place the numbers in descending order.

46.2	9.64	46.02	40.46

Complete.

1.11 ◯ 1.12 ◯ 1.13

3.32 ◯ 3.23 ◯ 2.32

4.44 ◯ 4.34 ◯ 4.04

0.1_ < 0.1_ < 0.15

1.9_ < 1.9_ < 2.01

6.67 > 6._7 > 6.37

Order Decimals

Reasoning and Problem Solving

Spot the Mistake

Rosie is ordering some numbers in ascending order:

$0.09 < 0.99 < 10.01 < 1.35 < 9.09$

Can you explain her mistake?

Rosie hasn't considered the place value of the digits in the numbers and has just ordered by comparing individual digits left to right.

Some children have planted sunflowers and have measured their heights.

Child	Height
Beth	1.23 m
Tony	0.95 m
Rachel	1.02 m
Kate	1.2 m
Faye	99 cm
Emma	0.97 m

Order the children based on the heights of their sunflowers in both ascending and descending order.

Ascending:
Tony, Emma, Faye, Rachel, Kate, Beth

Descending:
Beth, Kate, Rachel, Faye, Emma, Tony

Round Decimals

Notes and Guidance

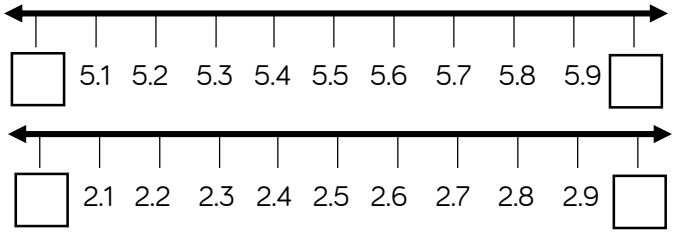
Children round numbers with 1 decimal place to the nearest whole number. They look at the digit in the tenths column to understand whether to round a number up or not. It is best to avoid the phrase 'round down' as this can sometimes lead to misconceptions. Children need to be taught that if a number is exactly half-way, then by convention we round up to the next integer.

Mathematical Talk

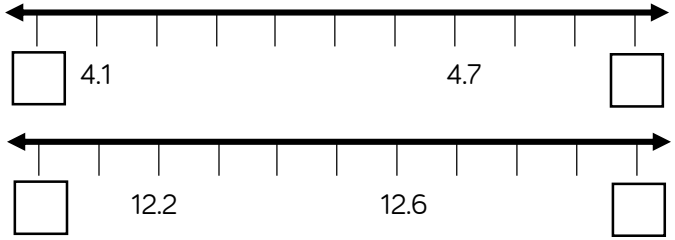
Which whole numbers does the decimal lie between?
Which whole number is the decimal closer to on the number line?
Which column do we focus on when rounding to the nearest whole number?
Which digits in the tenths column do not round up to the nearest whole number?
Which digits in the tenths column round up to the nearest whole number?

Varied Fluency

Which integers do the decimals lie between?



Complete the sentences to describe each decimal.



____ is closer to ____ than ____

____ rounds to ____ to the nearest whole number.

Circle the numbers that round up to the nearest whole number.

4.5 3.7 2.3 4.2 16.8 1.9

Round Decimals

Reasoning and Problem Solving

Mo says 0.4 rounded to the nearest whole number is zero.

Whitney says 0.4 rounded to the nearest whole number is one.

Who is correct? Why?

Mo is correct. 0.4 lies between 0 and 1, as there are only four tenths, the number rounds to zero.

A number with one decimal place rounded to the nearest whole number is 45

What could the number be?

The number could be:
44.5, 44.6, 44.7, 44.8, 44.9, 45.1, 45.2, 45.3 or 45.4

Halves and Quarters

Notes and Guidance

Children write $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{3}{4}$ as decimals. They use concrete and pictorial representations to support the conversion.
Children use their knowledge of equivalent fractions to write fractions as hundredths and then write the fractions as halves or quarters.

Mathematical Talk

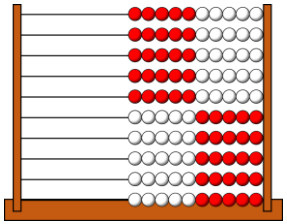
How would you write your answer as a decimal and a fraction?

Can you represent one quarter using decimal place value counters?

Can you represent three quarters using counters on a place value grid?

Varied Fluency

Here is a rekenrek with 100 beads.



____ out of 100 beads are red.

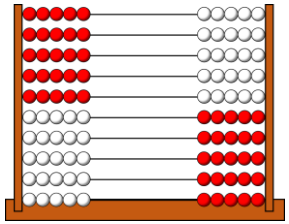
____ out of 100 beads are white.

$\frac{\square}{100}$ are red, and $\frac{\square}{100}$ are white.

Half of the beads are red, and half of the beads are white.

$\frac{1}{2} = \frac{50}{100} = \frac{5}{10}$, so $\frac{1}{2}$ is _____ as a decimal.

The beads are split equally on each side of the rekenrek.



There are 4 equal groups.

1 out of 4 equal groups = ____ beads.

1 out of 4 equal groups = $\frac{\square}{100}$

$\frac{1}{4} = \frac{\square}{100} =$ _____

What fraction is represented by 3 out of the 4 groups?
Can you write this as a decimal?

$\frac{3}{4} = \frac{\square}{100} =$ _____

Halves and Quarters

Reasoning and Problem Solving

Alex says:

If I know $\frac{1}{2}$ is 0.5 as a decimal, I also know $\frac{3}{6}$, $\frac{4}{8}$ and $\frac{6}{12}$ are equivalent to 0.5 as a decimal.

Explain Alex's thinking.

Alex has used her knowledge of equivalent fractions to find other fractions that are equivalent to 0.5

Dexter has made a mistake when converting his fractions to decimals.

$\frac{1}{2} = 1.2$, $\frac{1}{4} = 1.4$ and $\frac{3}{4} = 3.4$

What mistake has Dexter made?

Dexter has incorrectly placed the numerator in the ones column and the denominator in the tenths column. He should have used equivalent fractions with tenths and or hundredths to convert the fractions to decimals.