Jeavons Wood
Primary School

Year 4

Key Mathematical Concepts and representations

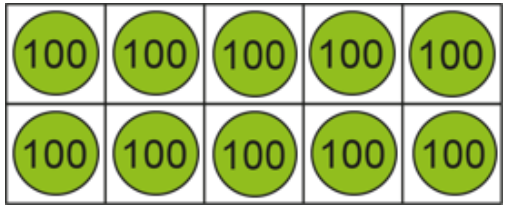
Number and Place Value

Year 4

Equivalence of 10 hundreds and 1 thousand (1)

Vocabulary:

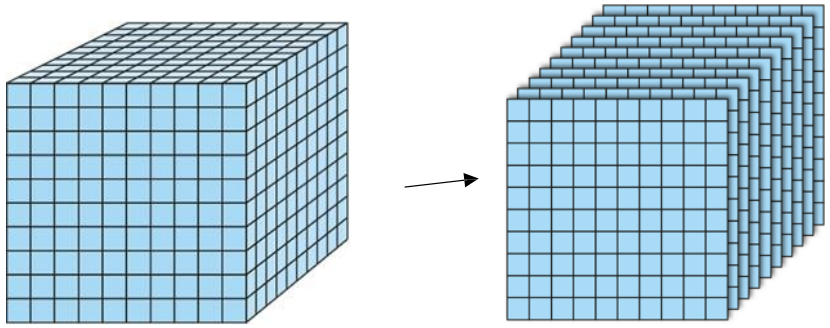
Ones Tens Hundreds Thousands Place Value Counters Pence Coin Tens Frame Multiple Previous Next Gattegno Dienes One-tenth the size Ten-times the size Centimetres Metres Millilitres Litres Grams Kilograms



1,000

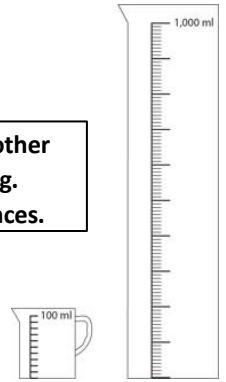
Count in multiples of 100 to 1000 using Place Value Counters.

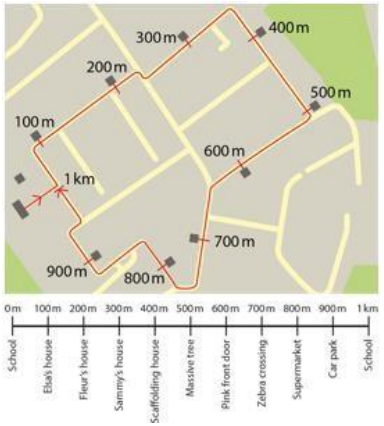
10 hundreds are equivalent to 1000.

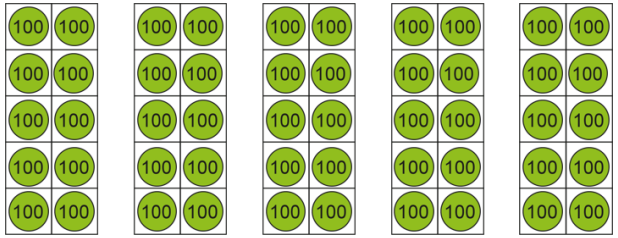


Demonstrate using Dienes that 10 hundreds are equal to 1 thousand.

Make connections to other forms of measure eg. measuring jugs, distances.







Recognise the number of hundreds in a four-digit number.

10 hundreds are equivalent to 1000.

18 hundreds are equivalent to 1800.

Dual count in hundreds

Eight hundred, nine hundred, one thousand, one thousand one hundred….

Eight hundred, nine hundred, ten hundreds, eleven hundreds…

Grouping and Exchanging Models

Number and Place Value

Year 4

Equivalence of 10 hundreds and 1 thousand (2)

Vocabulary:

Ones Tens Hundreds Thousands Place Value Counters Pence Coin Tens Frame Multiple Previous Next Gattegno Dienes One-tenth the size Ten-times the size Centimetres Metres Millilitres Litres Grams Kilograms

100	200	300	400	500	600	700	800	900	1,000
1,100	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000
2,100	2,200	2,300	2,400	2,500	2,600	2,700	2,800	2,900	3,000
3,100	3,200	3,300	3,400	3,500	3,600	3,700	3,800	3,900	4,000
4,100	4,200	4,300	4,400	4,500	4,600	4,700	4,800	4,900	5,000
5,100	5,200	5,300	5,400	5,500	5,600	5,700	5,800	5,900	6,000
6,100	6,200	6,300	6,400	6,500	6,600	6,700	6,800	6,900	7,000
7,100	7,200	7,300	7,400	7,500	7,600	7,700	7,800	7,900	8,000
8,100	8,200	8,300	8,400	8,500	8,600	8,700	8,800	8,900	9,000
9,100	9,200	9,300	9,400	9,500	9,600	9,700	9,800	9,900	10,000

Count in multiples of hundred up to 1000.

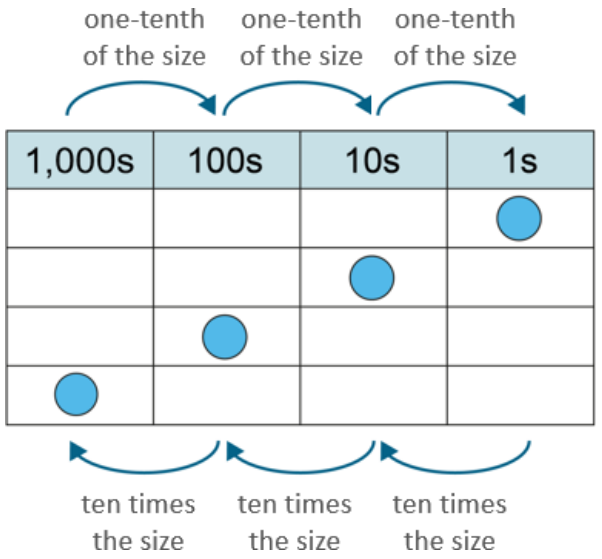
Eight hundred, nine hundred, one thousand, one thousand one hundred….

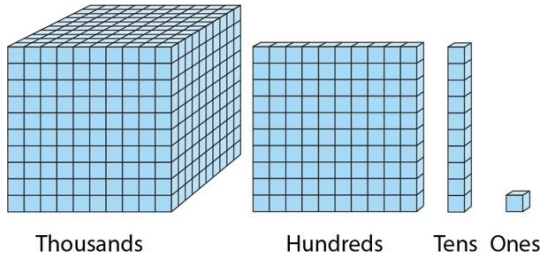
Eight hundred, nine hundred, ten hundreds, eleven hundreds…

1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

Tap the Gattegno chart in multiples of 100.

Create multiples of ten using the Gattegno chart.





Consider how a number increases/decreases in size using scaling models.

1000 is ten times the size of 100.

100 is one-tenth the size of 1000.

Scaling Models

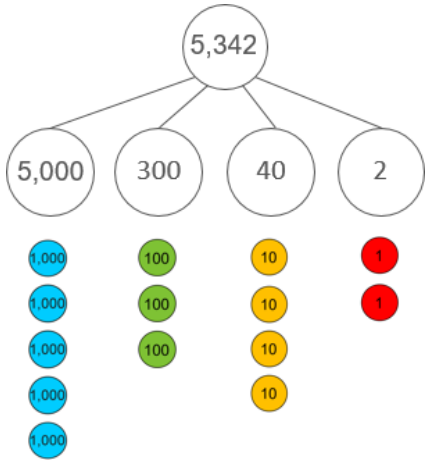
Number and Place Value

Year 4

Place Value in 4-digit numbers

Vocabulary:

Ones Tens Hundreds Thousands Digit Represents Place Value Counters Gattegno Partition Combine Equation Addend Sum Minuend Subtrahend Difference



Form 4-digit numbers using place value counters and the part-part-whole model.

The 2 represents 2 ones

The 4 represents 4 tens

The 3 represents 3 hundreds.

The 5 represents 5 thousands

Write as an additive equation.

1,000s	100s	10s	1s
5	3	4	2

Explain what each digit represents and give its value.

The 2 represents 2 ones. It has a value of 2.

The 4 represents 4 tens. It has a value of 40.

The 3 represents 3 hundreds. It has a value of 300.

The 5 represents 5 thousands

5,000 + 300 + 40 + 2 = 5,342

5,342

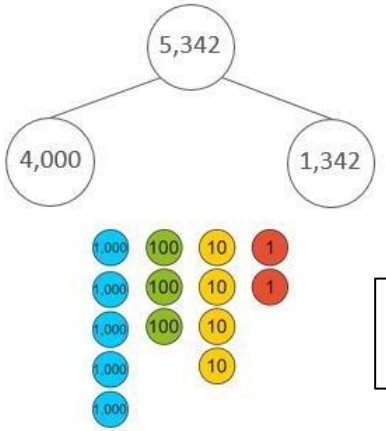
1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

5,000 + 300 + 40 + 2 = 5,342

5,342 = 40 + 2 + _____ + _____

Form 4-digit numbers using a Gattegno chart.

Identify missing parts of an equation.



Explore non-standard partitioning using part-part-whole models and place value counters.

Number and Place Value

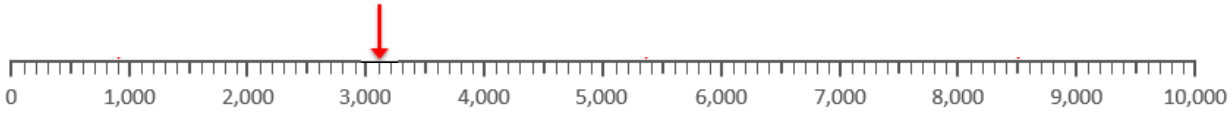
Year 4

Four-digit numbers in the linear number system (1)

Vocabulary:

Ones Tens Hundreds Thousands Place Value Number line Halfway
Multiples of 100/1000 Previous Next Between Round Greater than

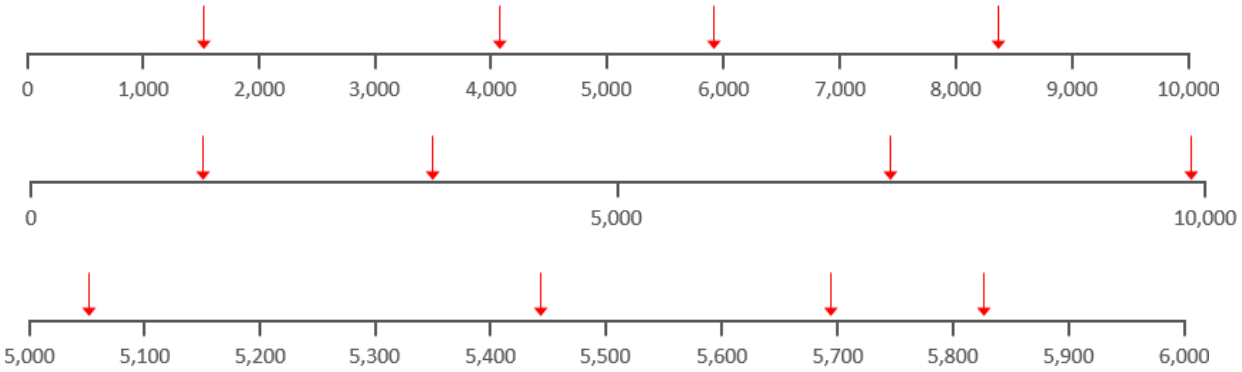
Less than Grams Millilitres Estimate



Identify the previous and next multiple of one thousand that a number sits between.

3200 is between 3000 and 4000.

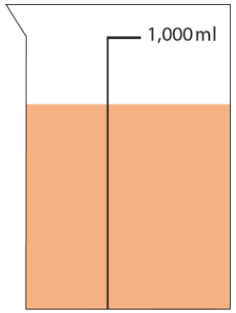
The previous multiple of 1000 is 3000. The next multiple of 1000 is 4000.

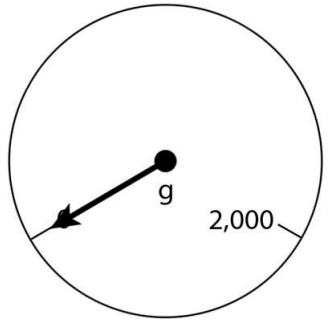


Make connections between the number line and the blank number line.

Estimate the position of numbers of the blank number line.

Recognise the previous and next multiple of 10 and 100 frequently.





Estimate the position of a 3 digit number number lines that are contextualised.

Number and Place Value

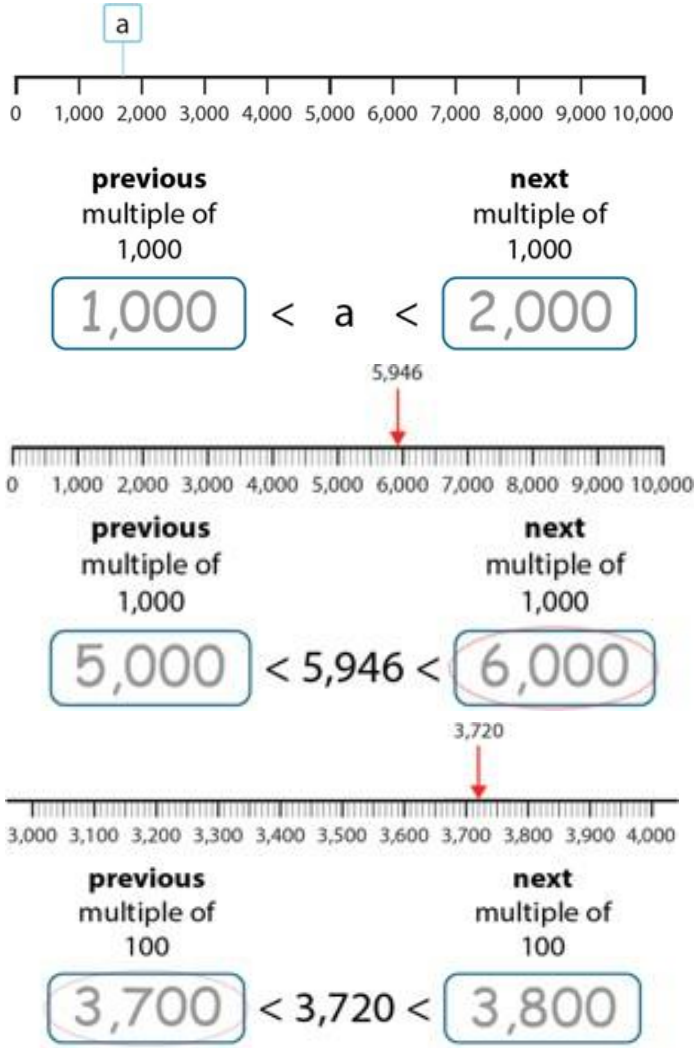
Year 4

Four-digit numbers in the linear number system (2)

Vocabulary:

Ones Tens Hundreds Thousands Place Value Number line Halfway
Multiples of 100/1000 Previous Next Between Round Greater than

Less than Estimate



Round to the nearest 1000 and nearest 100.

Build towards finding the previous and next multiple of 100/1000 for any 4-digit number without representations.

The previous multiple of 1,000 is __.

The next multiple of 1,000 is __.

a is greater than ____and less than ____.

a is nearest to ____.

5,725

1,000s	100s	10s	1s	
5	7	2	5	
6	0	0	0	nearest 1,000
5	7	0	0	nearest 100

Number and Place Value

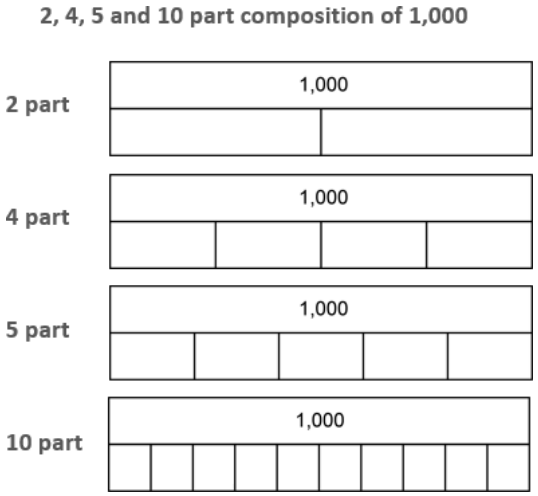
Year 4

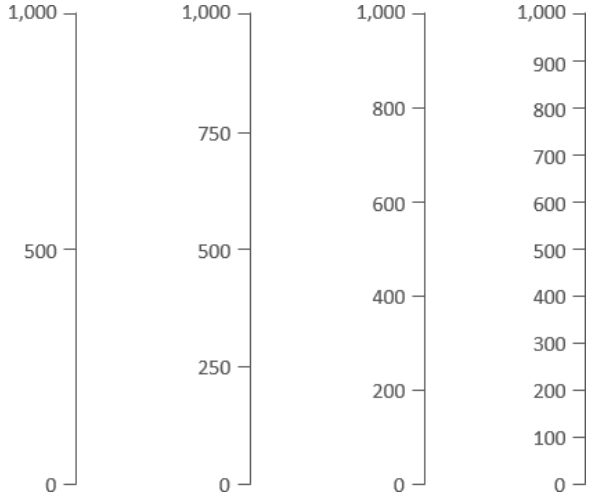
Reading scales with intervals of 2, 4, 5 or 10.

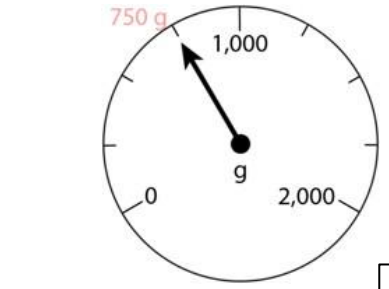
Vocabulary:

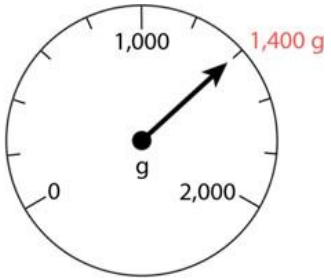
Intervals Scales Divisions Equal Parts Whole Value

Bar model Plus Minus Multiply Divide Bar graph Grams



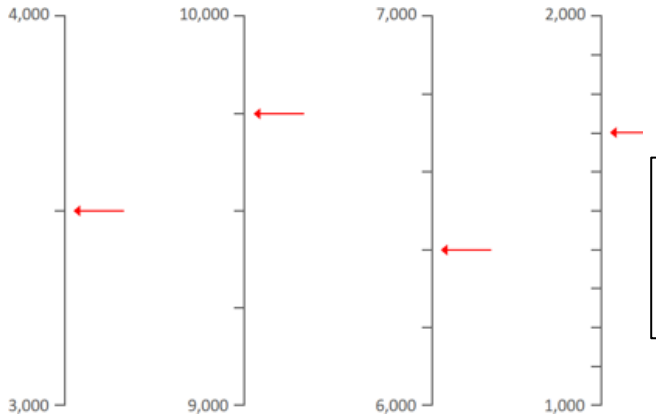




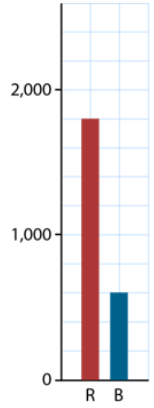


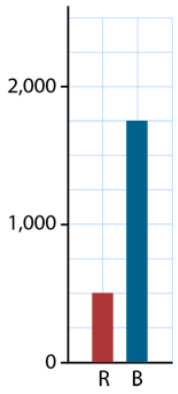
Use the number of intervals given to find values in other contexts (e.g. weighing scales/bar graphs)

Identify intervals and count forwards/backwards using these intervals with both bar models and vertical number lines.



Use the number of intervals given to find the numbers that the arrows are pointing to.





Multiplication and Division

Year 4

Multiplying and Dividing by 10 and 100

Vocabulary:

Multiply Divide Unitise Ten/Hundred times Bigger Smaller One-tenth the size One-hundredth the size Gattegno chart Factor Product Multiple Groups of Inverse

1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

Develop language in order to multiply and divide by 10 or 100.

80 is ten times bigger than 8.
8 is ten times smaller than 80.
80 is ten times the size of 8
8 is one-tenth the size of 80.

800 is one hundred times bigger than 8.
8 is one hundred times smaller than 800.
800 is on hundred times the size of 8
8 is one-hundredth the size of 80.

8 x 1 = 8
8 x 1 ten – 8 tens
8 x 1 hundred = 8 hundreds

Generalisations

All multiples of 10 have a ones digit of zero.

All multiples of 100 have both a tens and ones digit of zero.

To find the inverse of ___times as many, you divide by ____.

If one factor if made ____times bigger/smaller then the product will be ten times bigger/smaller

8 made ____times the size is ____.

ten times the size
x10

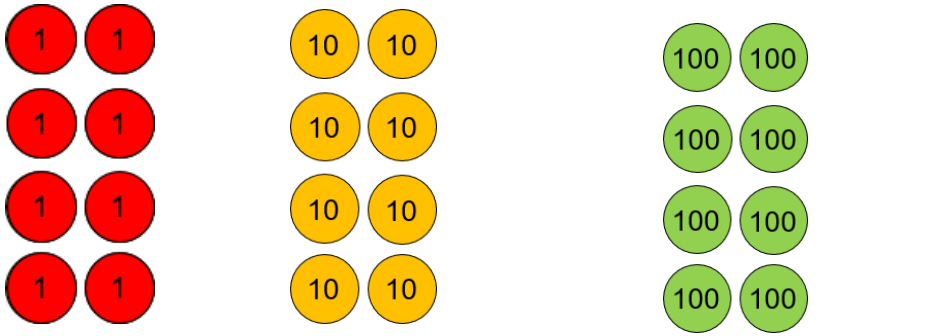
1,000s	100s	10s	1s
			8
		8	0

÷10
one-tenth of the size

one hundred times the size
x100

1,000s	100s	10s	1s
			8
	8	0	0

÷100
one-hundredth of the size



8 × 1 = 8 **8 × 10 = 80** **8 × 100 = 800**

8 groups of ____is ____.

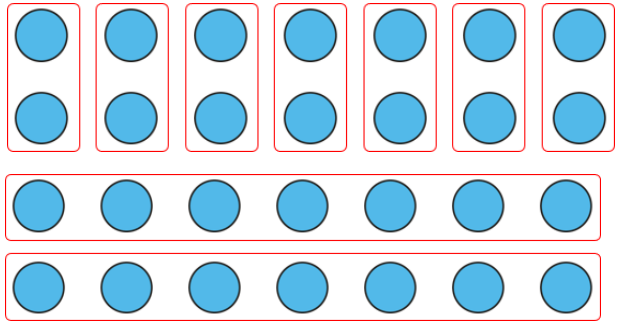
Multiplication and Division

Year 4

Manipulating the Multiplicative Relationship

Vocabulary:

Multiply Divide Commutative Groups of Times Equal to Factors
Product Quotient Dividend Divisor Represents Array



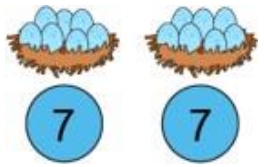
$2 \times 7 = 7 \times 2$

Understand that multiplication is commutative and the factors can be

2 groups of 7 is equal to 14.

2, 7 times is equal to 14.

2 groups of 7 is equal to 7, two times.



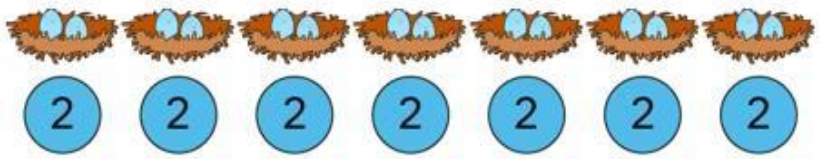
$2 \times 7 = 14$

$7 \times 2 = 14$

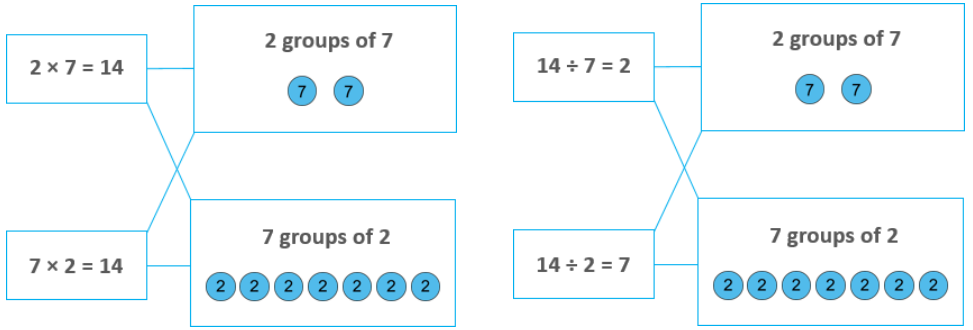
The 2 represents ___.

The 7 represents ___.

The 14 represents ___.



Match equations to representations and contexts.



Multiplication and Division

Year 4

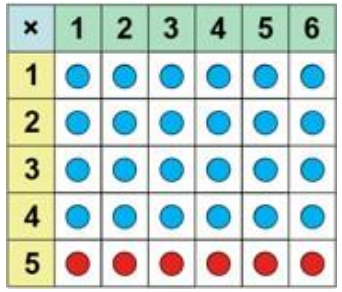
The Distributive Property of Multiplication

Vocabulary:

Multiplication Distributive Law Adjacent Multiples Factors Partitioning Equations Expressions ArraysPart-whole model Difference

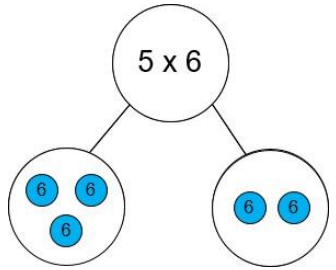
0 × 6 = 0	6 × 0 = 0
1 × 6 = 6 (+ 6)	6 × 1 = 6 (+ 6)
2 × 6 = 12 (+ 6)	6 × 2 = 12 (+ 6)
3 × 6 = 18 (+ 6)	6 × 3 = 18 (+ 6)
4 × 6 = 24 (+ 6)	6 × 4 = 24 (+ 6)
5 × 6 = 30 (+ 6)	6 × 5 = 30 (+ 6)
6 × 6 = 36	6 × 6 = 36
7 × 6 = 42	6 × 7 = 42
8 × 6 = 48	6 × 8 = 48
9 × 6 = 54	6 × 9 = 54
10 × 6 = 60	6 × 10 = 60
11 × 6 = 66	6 × 11 = 66
12 × 6 = 72	6 × 12 = 72

Adjacent multiples of ____have a difference of ___.



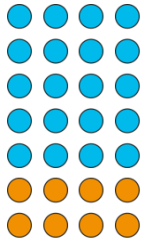
4 × 6 + 6

Five sixes is one more six than four sixes.



3 x 6 + 2 x 6 = 5 x 6

5 is equal to 3 plus 2, so 5 sixes is equal to 3 sixes plus 2 sixes.



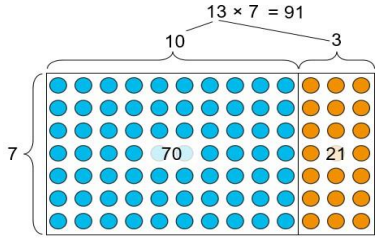
7 = 5 + 2

7 × **4** = 5 × **4** + 2 × **4**

= 20 + 8

= 28

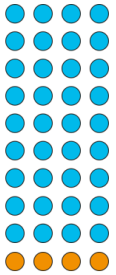
We can partition one of the factors to make calculations easier.



13 × 7 = 10 × 7 + 3 × 7

= 70 + 21

= 91



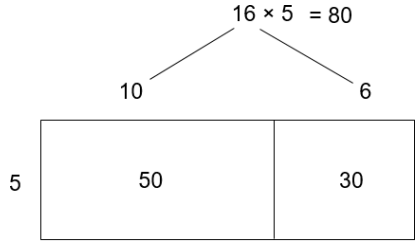
9 = 10 − 1

9 × 4 = **10** × 4 − **1** × 4

= 40 − 4

= 36

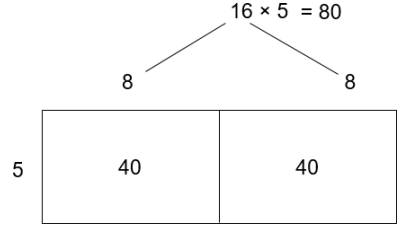
We can partition the factors in different ways to make calculations easier.



16 × 5 = 10 × 5 + 6 × 5

= 50 + 30

= 80



16 × 5 = 8 × 5 + 8 × 5

= 40 + 40

= 80

Fractions

Year 4

Mixed Numbers in the Linear Number System

Vocabulary:

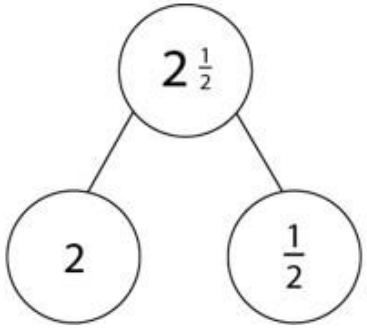
Fraction Notation Divided Equal Numerator Denominator Whole Parts Fraction Bar (Vinculum) Half Third Quarter Fifth Sixth Seventh Eighth Ninth Tenth One-_____ Add Subtract (Minus) Number line Part-Part-Whole Model Units Previous Next Estimate Intervals

Quantities that are made up of both wholes and parts are called Mixed Numbers.

There are two whole oranges. There is half an orange. There are two and a half oranges altogether.

There are more than two whole oranges.

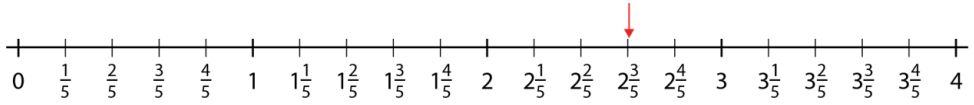
There are less than three whole oranges.

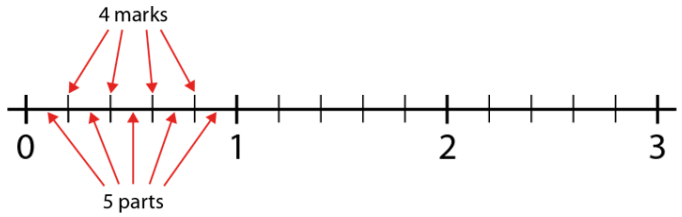


We can place Mixed Numbers on a number line.

There are ____parts between zero and one. This means we are counting in units of ____.

The line is divided into ____equal parts. This means we are counting in ____s.

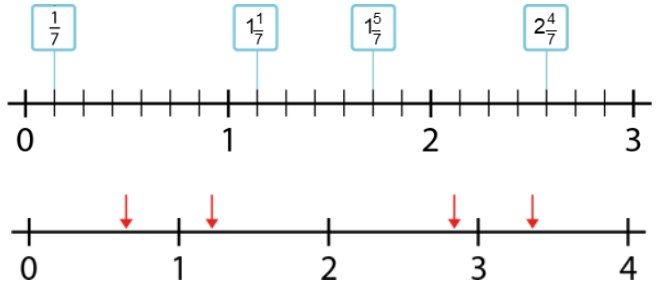




We can use our knowledge of ordering proper fractions to order Mixed Numbers.

$1\frac{1}{7}$ is between 1 and 2. The previous number is 1. The next number is 2.

We can use our knowledge of placing mixed numbers on a number line to estimate the position of a Mixed Number on a blank number line.



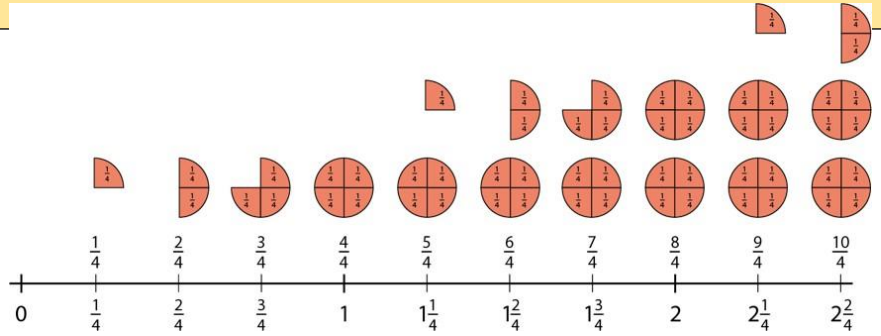
Fractions

Year 4

Convert between Mixed Numbers and Improper Fractions

Vocabulary:

Fraction Notation Divided Equal Numerator Denominator Whole Parts Fraction Bar (Vinculum) Half Third Quarter Fifth Sixth Seventh Eighth Ninth Tenth One-_____ Number line Part-Part-Whole Model Units Previous Next Estimate Intervals Convert Improper Fractions Mixed Numbers



We can count in unit fractions over 1 whole and record this as either a Mixed Number or an Improper Fraction.

We can dual count to support this:

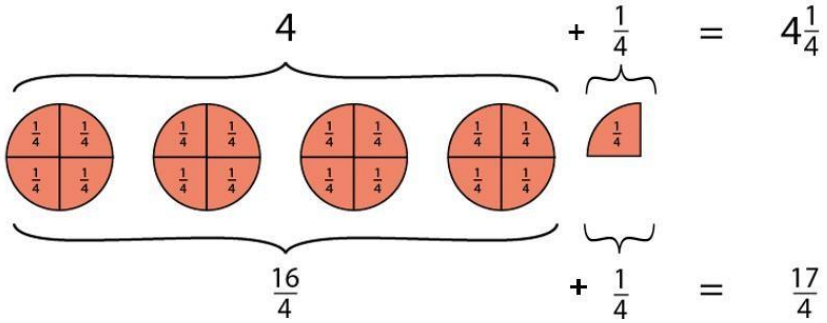
1 quarter, 2 quarter, 3 quarters, 4 quarters, 5 quarters …

1 quarter, 2 quarter, 3 quarters, 1 whole, 1 whole and 1 quarter…

1 group of 4 quarters is 1 whole

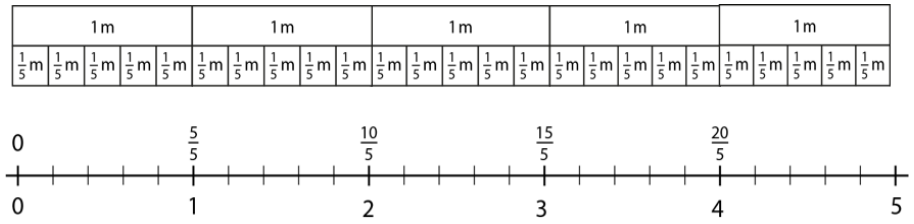
2 groups of 4 quarters in 2 wholes

3 groups of 4 quarters is 3 wholes



There are ___groups of 4 quarters which is ___quarters, and ___more quarters, so that is ___quarters in total.

This counting can be connected to wider contexts including measures.



Fractions

Year 4

Convert between Mixed Numbers and Improper Fractions

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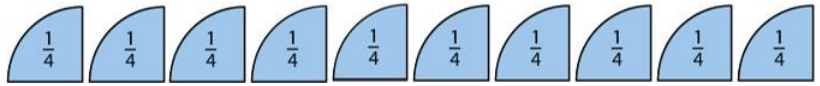


$\frac{10}{4}$

1 1

$\frac{2}{4}$

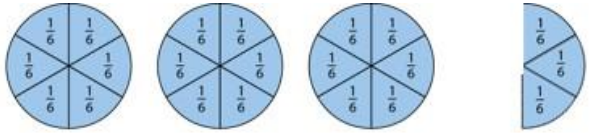
$\frac{10}{4} = 2\frac{2}{4}$

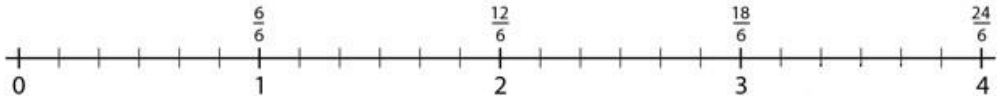
We can convert between Improper Fractions and Mixed Numbers by thinking about the counting unit.

Our unit is quarters so we will be thinking about groups of 4.

There are ___groups of four quarters which is ____-quarters, and ____more quarters, so that is ____-quarters.

How many groups of 4 quarters in 10 quarters?





We can convert between Improper Fractions and Mixed Numbers by thinking about the counting unit.

Each whole has been divided into ____equal parts. We have ___ of these equal parts. This represents _____s.

This knowledge can be connected to wider contexts including area, quantities, linear and volumes.

Generalise:

If we multiply the number of wholes by the denominator, we can find the value of the numerator.

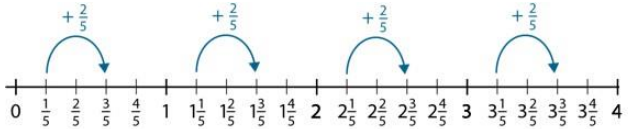
Fractions

Year 4

Add and Subtract Improper Fractions and Mixed Fractions (Same Denominator) (1)

Vocabulary:

Fraction Notation Divided Equal Numerator Denominator Whole Parts Fraction Bar (Vinculum) Half Third Quarter Fifth Sixth Seventh Eighth Ninth Tenth One-_____ Number line Part-Part-Whole Model Units Previous Next Estimate Intervals Convert Improper Fractions Mixed Numbers Add Subtract (Minus)

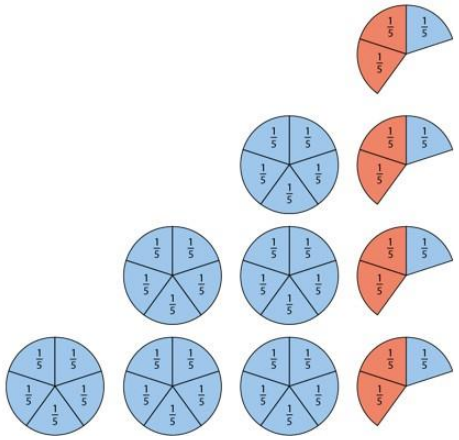


$\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$

$1\frac{1}{5} + \frac{2}{5} = 1\frac{3}{5}$

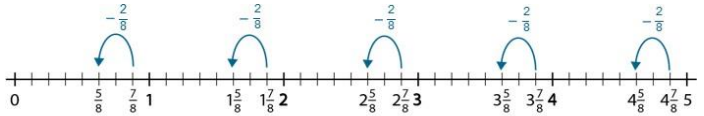
$2\frac{1}{5} + \frac{2}{5} = 2\frac{3}{5}$

$3\frac{1}{5} + \frac{2}{5} = 3\frac{3}{5}$



We can apply our understanding of adding fractions within one with the same denominator to adding a mixed number and fractions within one with the same denominators.

The parts are ___and __. The total, or <u>whole</u>, is __.



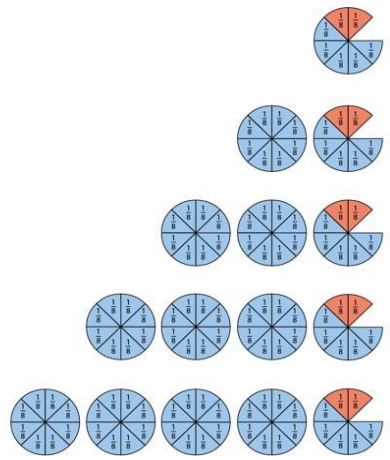
$\frac{7}{8} - \frac{2}{8} = \frac{5}{8}$

$1\frac{7}{8} - \frac{2}{8} = 1\frac{5}{8}$

$2\frac{7}{8} - \frac{2}{8} = 2\frac{5}{8}$

$3\frac{7}{8} - \frac{2}{8} = 3\frac{5}{8}$

$4\frac{7}{8} - \frac{2}{8} = \boxed{4\frac{5}{8}}$



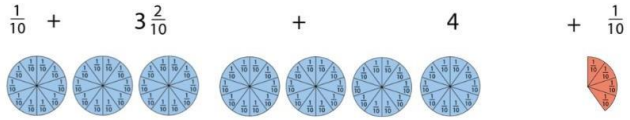
We can apply our understanding of subtracting fractions within one with the same denominator to subtract a fraction within one from a mixed number with the same denominators.

The total, or <u>whole</u>, is __. One part is __. The missing part is ____.

$\frac{1}{10} + 3\frac{2}{10} + 4 + \frac{1}{10}$

When adding combined mixed numbers and fractions within one, we combine the parts and then combine the wholes.

The parts are ___and __. The total, or <u>whole</u>, is __.



$7\frac{4}{10}$

Fractions

Year 4

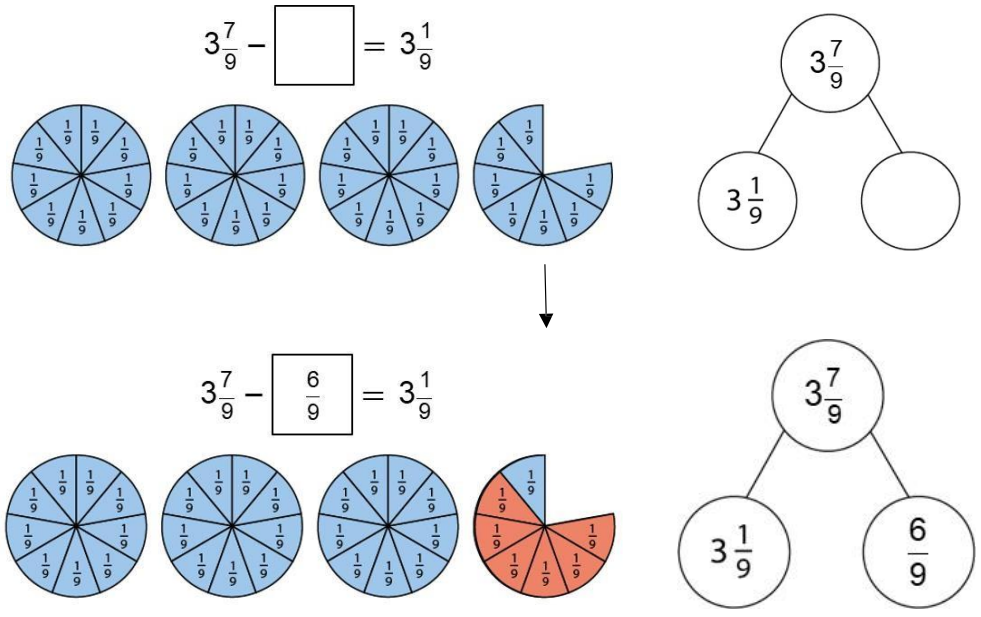
Add and Subtract Improper Fractions and Mixed Fractions (Same Denominator) (2)

Vocabulary:

Fraction Notation Divided Equal Numerator Denominator Whole Parts Fraction Bar (Vinculum) Half Third Quarter Fifth Sixth Seventh Eighth Ninth Tenth One-_____ Number line Part-Part-Whole Model Units Previous Next Estimate Intervals Convert Improper Fractions Mixed Numbers Add Subtract (Minus)

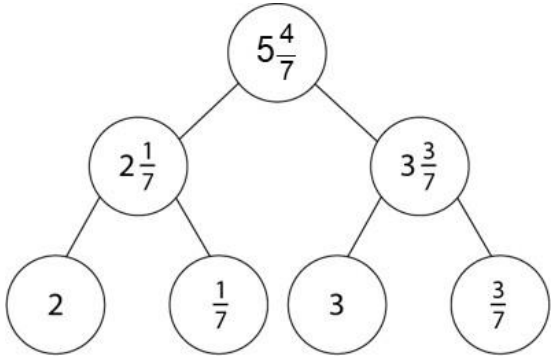
When subtracting fractions within one from a mixed number, we subtract the fraction to reveal the missing part. We can use a part-whole model to help represent this.

The total, or <u>whole</u>, is __. One part is __. The missing part is ___.



Representing addition and subtraction of mixed numbers and fractions within one, using a part-whole model can be helpful when problem solving.

The parts are ___and __. The total, or <u>whole</u>, is __.



Generalisations:

When adding fractions with the same denominator, just add the numerators.

When subtracting fractions with the same denominator, just subtract the numerators.

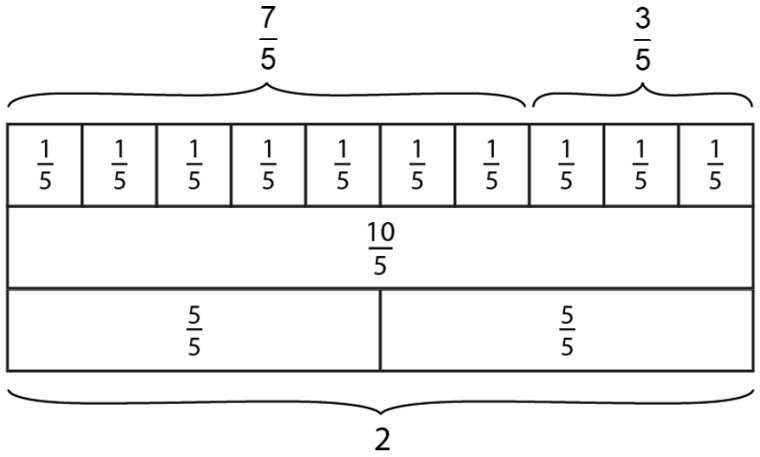
Fractions

Year 4

Add and Subtract Improper Fractions and Mixed Fractions (Same Denominator) (3)

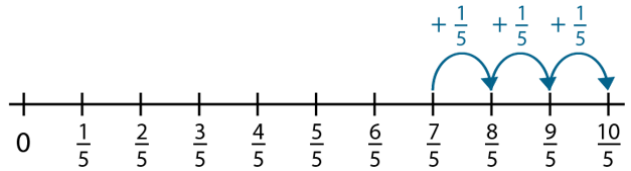
Vocabulary:

Fraction Notation Divided Equal Numerator Denominator Whole Parts Fraction Bar (Vinculum) Half Third Quarter Fifth Sixth Seventh Eighth Ninth Tenth One-_____ Number line Part-Part-Whole Model Units Previous Next Estimate Intervals Convert Improper Fractions Mixed Numbers Add Subtract (Minus)

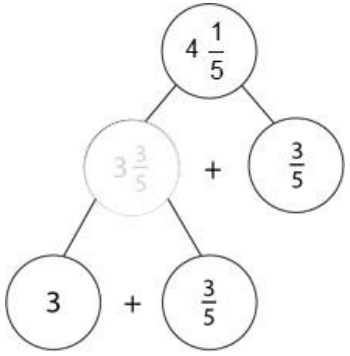


We can apply our understanding of unitising and converting between improper fractions and mixed numbers when adding improper fractions.

7 one-fifths and 3 one-fifths is equal to 10 one-fifths.

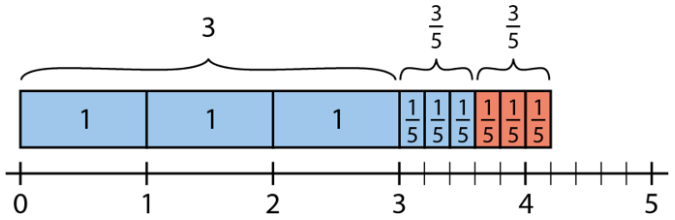


$\frac{7}{5} + \frac{3}{5} = \frac{10}{5} = 2$



Partitioning a mixed number and then adding the fractional parts is helpful when adding mixed numbers with fractions within one that result in bridging over a whole.

3 one-fifths and 3 one-fifths is equal to 6 one-fifths. This is equal to one whole and 1 one-fifth.



Fractions

Year 4

Add and Subtract Improper Fractions and Mixed Fractions (Same Denominator) (4)

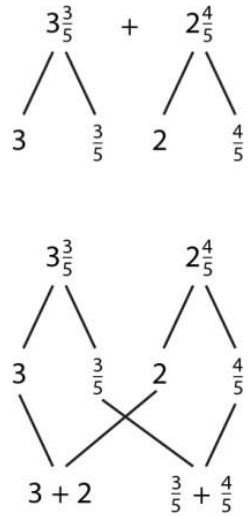
Vocabulary:

Fraction Notation Divided Equal Numerator Denominator Whole Parts Fraction Bar (Vinculum) Half Third Quarter Fifth Sixth Seventh Eighth Ninth Tenth One-_____ Number line Part-Part-Whole Model Units Previous Next Estimate Intervals Convert Improper Fractions Mixed Numbers Add Subtract (Minus) Aggregation Augmentation Reduction Partitioning Difference

$$3\frac{3}{5}+2\frac{4}{5}=$$

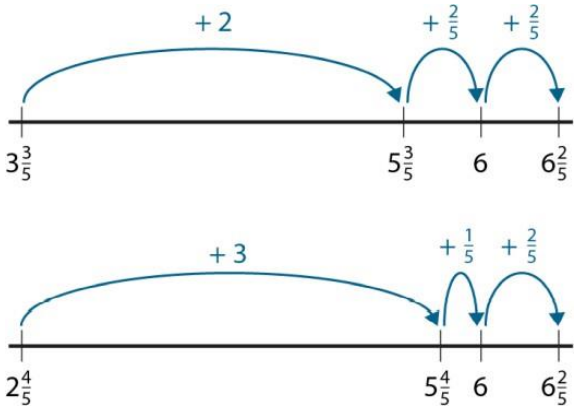
When adding two mixed numbers which bridge a whole, we can apply either a counting on (augmentation) or counting all (aggregation) strategy.

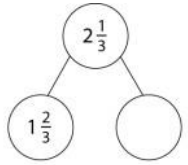
Counting all (aggregation) strategy.

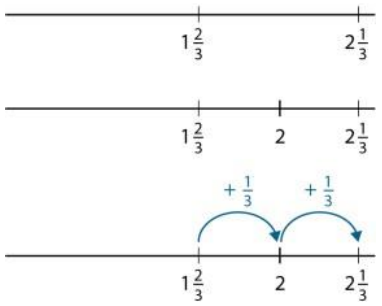


$5\frac{7}{5}$

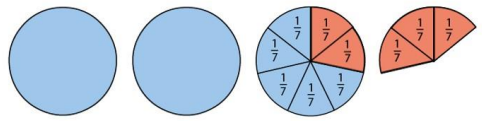
Counting on (augmentation) strategy.

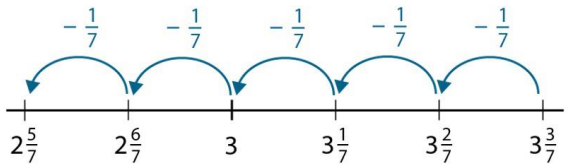




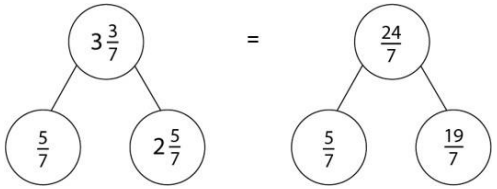


$3\frac{3}{7}-\frac{5}{7}$

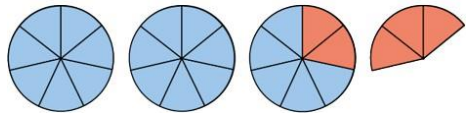




We can subtract a fraction from a mixed number with the same denominator using our awareness of converting between mixed numbers and improper fractions.



$3\frac{3}{7}-\frac{5}{7}=2\frac{5}{7}$



We can also subtract a fraction from a mixed number with the same denominator using our understanding of subtraction as finding the difference.