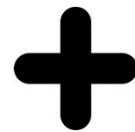


# Winton's Mathematical Methods and Calculation Policy

## Year 5 and 6



# Addition



## Vocabulary

add  
 addend  
 total  
 increase  
 more  
 plus  
 make  
 sum  
 altogether  
 estimate  
 number bonds

$256 + 313 =$  ,  $256 + 313 = 569$   
 $200 + 50 + 6$   $200 + 50 + 6 = 569$   
 $300 + 10 + 3$   $300 + 10 + 3 = 569$

## 2. Expanded Partitioning Column

$353 + 268 = 621$   
 $H \quad T \quad O$   
 $300 + 50 + 3$   
 $200 + 60 + 8$   
 $100 + 10$   
 $600 + 20 + 1 = 621$

## 5. Column: Decimals

$2.31 + 3.8$   
 $2.31$   
 $3.80$   
 $\underline{+}$   
 $6.11$

add a place holder

## 1. Partitioning

$32 + 26 = 58$   
 $T: \quad 3 \quad 2 \quad + \quad 2 \quad 6 \quad = \quad 5 \quad 8$   
 $U: \quad 3 \quad 0 \quad + \quad 2 \quad 0 \quad = \quad 5 \quad 0$   
 $30 + 20 = 50$   
 $2 + 6 = 8$

## 3. Expanded Column

$252 + 476 = 728$   
 $H \quad T \quad O$   
 $2 \quad 5 \quad 2$   
 $4 \quad 7 \quad 6$   
 $8 \quad (2+6) \text{ ones}$   
 $1 \quad 2 \quad 0 \quad (50+70) \text{ Tens}$   
 $6 \quad 0 \quad 0 \quad (200+400) \text{ Hundreds}$

## 4. Compact column

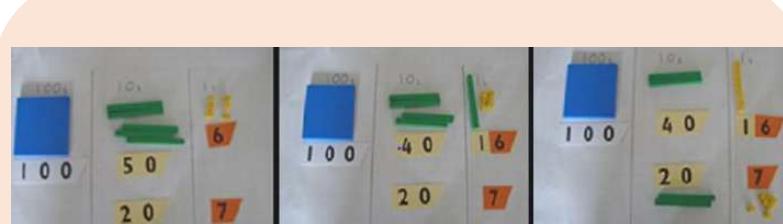
$252 + 476 = 728$   
 $789 + 642 = 1431$

Regrouped numbers

# Subtraction

## Vocabulary

subtract  
subtraction  
total  
decrease  
less  
minus  
amount  
estimate  
difference  
number bonds



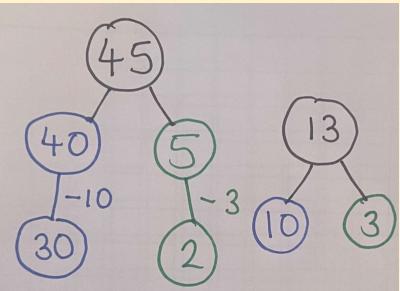
## 2. Expanded Partitioning Column

$$\begin{array}{r} 156 - 27 = 129 \\ \text{H} \quad \text{T} \quad \text{O} \\ \cancel{1}00 \quad \cancel{5}0 \quad 6 \\ \quad \quad 20 \quad 7 \\ \hline 100 + 20 + 9 = 129 \end{array}$$

## 1. Partitioning

$$45 - 13 = 32$$

A diagram showing the subtraction  $45 - 13 = 32$ . It uses yellow blocks to represent the numbers. The number 45 is shown as 4 tens and 5 ones. The number 13 is shown as 1 ten and 3 ones. The blocks are visually subtracted to show the result of 32.



## 3. Expanded Column

$$\begin{array}{r} 1456 \\ - 27 \\ \hline 129 \end{array}$$

$9$  (16 - 7) ones  
 $20$  (40 - 20) tens  
 $100$  (100 - 0) hundreds

## 5. Column: Decimals

$$\begin{array}{r} 6.11 - 3.8 \\ \cancel{5}6.11 \\ - 3.80 \\ \hline 2.31 \end{array}$$

add a place holder

## 4. Compact column

$$\begin{array}{r} 89137 \\ - 452 \\ \hline 485 \end{array}$$

# Multiplication

$\times$	0	1	2	3	4	5	6	7	8	9	10	11	12	13	100	50	25
3											30				300	150	75

## Vocabulary

multiply  
 multiplier  
 multiplicand  
 product  
 lots of  
 inverse  
 derive  
 factors  
 common factors  
 multiples  
 common multiples  
 composite numbers  
 prime numbers  
 prime factors  
 square numbers  
 cubed numbers  
 convert

## 2. Expanded Column

$$\begin{array}{r}
 402 \\
 \times 4 \\
 \hline
 160 \quad (4 \times 40) \\
 168 \quad (4 \times 2) \\
 \hline
 168
 \end{array}$$

$$\begin{array}{r}
 36 \times 15 \\
 \begin{array}{r}
 36 \\
 \times 15 \\
 \hline
 18 \quad (4 \times 2) \\
 30 \quad (5 \times 6) \\
 150 \quad (5 \times 30) \\
 60 \quad (10 \times 6) \\
 300 \quad (10 \times 30) \\
 \hline
 540
 \end{array}
 \end{array}$$

## 1. Grid Method

$$\begin{array}{r}
 3.2 \times 2.4 = 7.68 \\
 \begin{array}{r}
 3.2 \\
 \times 2.4 \\
 \hline
 12 \quad 4 \\
 36 \quad 12 \\
 \hline
 0.8 \quad 0.8 \\
 0.2 \quad 4 \\
 \hline
 7.68
 \end{array}
 \end{array}$$



$$\begin{array}{r}
 \times 40 \quad 2 \\
 4 \quad 160 \quad 8 \\
 \hline
 42 \times 4 = 168 \\
 160 + 8 = 168
 \end{array}$$

## 4. Short column: Decimals

$$\begin{array}{r}
 3.9 \times 30 \\
 \begin{array}{r}
 \downarrow \times 10 \\
 3.9 \\
 \times 30 \\
 \hline
 00 \\
 1170 \div 10 = 117
 \end{array}
 \end{array}$$

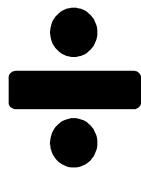
Use adjustment strategy

## 3. Short column

$$\begin{array}{r}
 362 \times 15 \\
 \begin{array}{r}
 362 \\
 \times 15 \\
 \hline
 1810 \\
 3620 \\
 \hline
 5430
 \end{array}
 \end{array}
 \quad
 \begin{array}{r}
 367 \times 4 = 1468 \\
 \begin{array}{r}
 367 \\
 \times 4 \\
 \hline
 1468
 \end{array}
 \end{array}$$

'Be a hero, add a 0'

# Division



## Vocabulary

divisor  
 dividend  
 quotient  
 share  
 equal  
 groups of  
 inverse  
 derive  
 factors  
 common factors  
 multiples  
 prime factors  
 common multiples  
 composite numbers  
 prime numbers  
 convert

## 2. Short (Bus Stop) with remainders

$$823 \div 4 = 205 \text{ r}^3$$

$$4 \overline{)823}$$

Using known facts

$$27 \div 4 = 6 \text{ R } 3$$

Quotient: 6  
Divisor: 4  
Dividend: 27

$$205 \cdot 75$$

$$4 \overline{)823 \cdot 300}$$

Formal with decimal point and place holders

## 1. Short (Bus Stop)

179	$8 \div 5 = 1 \text{ r}^3$
58395	$39 \div 5 = 7 \text{ r}^4$
	$45 \div 5 = 9$

## 3. Short (Bus Stop): 2 digit divisors

$$3850 \div 25$$

$$900 \div 25 = 36$$

$$25 \overline{)900 \text{ r} 15}$$

$$25$$

$$50$$

$$75$$

$$100$$

$$125$$

$$150$$

$$175$$

## 4. Short (Bus Stop): Decimals

$$12.9 \div 3 = 4.3$$

$$3 \overline{)12.9}$$

& use of  
adjustment  
strategy

$$12.9 \div 3 = 4.3$$

$$\times 10 \quad \text{---} \quad 129 \div 3 = 43$$

$$3 \overline{)129}$$

$$\div 10 \quad \text{---} \quad 0.43$$

# Fractions +

## Vocabulary

numerator  
denominator  
unit fraction  
non-unit fraction  
equivalence  
equivalent  
proper fractions  
improper fractions  
mixed numbers  
simplify  
tenths  
hundredths  
percentage  
ratio  
proportion  
number of parts

## 2. Different denominators - finding common multiples (change one)

$$\frac{1}{5} + \frac{2}{10} = \frac{2}{5}$$

$\times 2$

$$\frac{2}{10} + \frac{2}{10} = \frac{4}{10} = \frac{2}{5}$$

$\div 2$

## 4. Mixed numbers

$$\begin{array}{r}
 \underline{1} \ \underline{\frac{2}{4}} + \underline{3} \ \underline{\frac{1}{8}} = 4 \ \underline{\frac{5}{8}} \\
 \begin{array}{r}
 1 + 3 = 4 \\
 \frac{2}{4} + \frac{1}{8} \\
 \downarrow \quad \downarrow \\
 \frac{4}{8} + \frac{1}{8} = \frac{5}{8} \\
 \end{array}
 \end{array}$$

## I. Common (same) denominator

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

### 3. Different denominators - finding common multiples (change both)

$$\begin{array}{r}
 \begin{array}{r}
 6 & 9 \\
 12 & 18 \times 2 \\
 18 & \times 3
 \end{array}
 \begin{array}{r}
 3 \\
 6
 \end{array}
 + \begin{array}{r}
 5 \\
 9
 \end{array} \times 2 = 1 \frac{1}{18}
 \end{array}$$
  

$$\begin{array}{r}
 24 \\
 \times 3
 \end{array}
 \begin{array}{r}
 9 \\
 \downarrow
 \end{array}
 + \begin{array}{r}
 10 \\
 18
 \end{array} \times 2 = 1 \frac{1}{18}$$

# Fractions

## Vocabulary

numerator  
denominator  
unit fraction  
non-unit fraction  
equivalence  
equivalent  
proper fractions  
improper fractions  
mixed numbers  
simplify  
tenths  
hundredths  
percentage  
ratio  
proportion  
number of parts

## 2. Different denominators - finding common multiples (change one)

$$\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 1 \\ \hline 10 \end{array} \quad \begin{array}{r} = \\ \hline \hline 3 \\ 10 \end{array}$$

## 4. Mixed numbers

$$1\frac{2}{6} - \frac{3}{6} =$$

$\left(\frac{6}{6} + \frac{2}{6}\right) \downarrow$

$$\frac{8}{6} - \frac{3}{6} = \frac{5}{6}$$

## I. Common (same) denominator

$$\frac{4}{5} - \frac{2}{5} = \frac{2}{5}$$

$\rightarrow$

1/1	1/1	2/2	2/2	
-----	-----	-----	-----	--

### 3. Different denominators - finding common multiples (change both)

$$\begin{array}{r}
 69 \\
 12 \text{ } (18) \times 2 \\
 18 \\
 \hline
 24 \text{ } (18) \times 2 \\
 18
 \end{array}
 \begin{array}{r}
 5 \\
 9 \\
 \hline
 10 \\
 18
 \end{array}
 \begin{array}{r}
 3 \\
 6 \\
 \hline
 9 \\
 18
 \end{array}
 \begin{array}{r}
 1 \\
 18 \\
 \hline
 18
 \end{array}$$

# Fractions

## Vocabulary

numerator  
denominator  
unit fraction  
non-unit fraction  
equivalence  
equivalent  
proper fractions  
improper fractions  
mixed numbers  
simplify  
tenths  
hundredths  
percentage  
ratio  
proportion  
number of parts

## 2. Multiplying fractions by whole numbers

$$\begin{array}{r}
 \underline{3} \\
 \underline{5} \\
 \downarrow \\
 \underline{\underline{3}} \\
 \underline{5}
 \end{array}
 \times
 \begin{array}{r}
 2 \\
 \downarrow \\
 \underline{\underline{2}} \\
 \underline{1}
 \end{array}
 = \frac{6}{5} = 1 \frac{1}{5}$$

$\frac{5}{5}$        $\frac{1}{5}$   
 "              "

111	111	111	111	111	111	111	111	111
1					$\frac{1}{5}$			

## I. Multiplying fractions

$$\begin{array}{r}
 \begin{array}{r}
 \begin{array}{r}
 2 \xrightarrow{x} 3 = 6 \\
 \hline
 4 \xrightarrow{x} 6 \quad 24
 \end{array}
 \end{array}
 \end{array}$$

### 3. Multiplying mixed numbers by whole numbers

$$2 \frac{1}{3} \times 4 = 9 \frac{1}{3}$$

2       $\frac{1}{3}$

$$2 \times 4 = 8$$

$$\frac{1}{3} \times \frac{4}{1} = \frac{4}{3} = 1 \frac{1}{3}$$

$\frac{3}{3}$        $\frac{1}{3}$   
"            1

$$8 + 1 \frac{1}{3} = 9 \frac{1}{3}$$

# Fractions

## Vocabulary

numerator  
 denominator  
 unit fraction  
 non-unit fraction  
 equivalence  
 equivalent  
 proper fractions  
 improper fractions  
 mixed numbers  
 simplify  
 tenths  
 hundredths  
 percentage  
 ratio  
 proportion  
 number of parts

## 2. Dividing fractions by whole numbers

$$\frac{1}{3} \div 2 = \frac{1}{3} \div \frac{2}{1} = \frac{1}{6}$$

$\downarrow \quad \downarrow \quad \downarrow$

$$\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$$

1. Keep

2. Change

3. Flip

## 1. Dividing fractions by fractions

$$\frac{2}{5} \div \frac{2}{3} = \frac{6}{10} = \frac{3}{5}$$

$\downarrow \quad \downarrow \quad \downarrow$

Keep, change, flip

$$\frac{2}{5} \times \frac{3}{2} = \frac{6}{10}$$

$$\frac{6}{10} \div 2 = \frac{3}{5}$$

$\frac{\div 2}{\div 2}$

Simplifying answers if possible

## 3. Dividing fractions by whole numbers and simplifying the answer

$$4 \div \frac{2}{3} = \frac{4}{1} \div \frac{2}{3} = \frac{6}{2}$$

$\downarrow \quad \downarrow \quad \downarrow$

$$\frac{4}{1} \times \frac{3}{2} = \frac{12}{2} = 6$$

Answers that can be converted to a whole number, must be converted.

# Number Facts

$$8 \times 10 = 80$$

$$80 \times 10 = 800$$

$$8 \times 100 = 800$$

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

$\times 100$  (left arrow)  $\times 10$  (up arrow)  $\times 10$  (up arrow)

$$8 \times 10 \times 10 = 8 \times 100$$

$$1,200 \div 10 = 120$$

$$120 \div 10 = 12$$

$$1,200 \div 100 = 12$$

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

$\div 100$  (left arrow)  $\div 10$  (up arrow)  $\div 10$  (up arrow)

## Multiplying and Dividing by 10, 100 and 1000

10 000	1000	100	10	1	$\bullet$ $\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
					$\bullet$		

### Multiplying

$\times 10$   
 $\times 100$   
 $\times 1000$

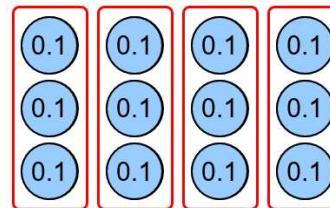
digits move LEFT 1 space  
 digits move LEFT 2 spaces  
 digits move LEFT 3 spaces



### Dividing

$\div 10$   
 $\div 100$   
 $\div 1000$

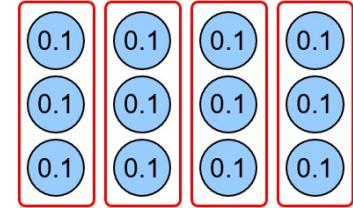
digits move RIGHT 1 space  
 digits move RIGHT 2 spaces  
 digits move RIGHT 3 spaces



$$4 \times 3 = 12$$

$$4 \times 3 \text{ tenths} = 12 \text{ tenths}$$

$$4 \times 0.3 = 1.2$$

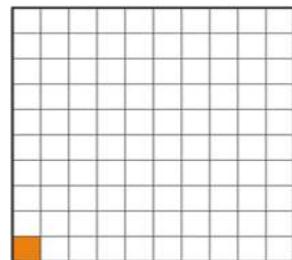
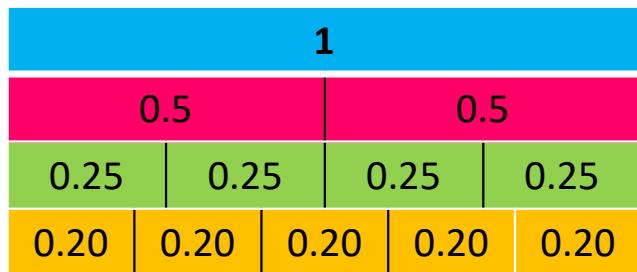
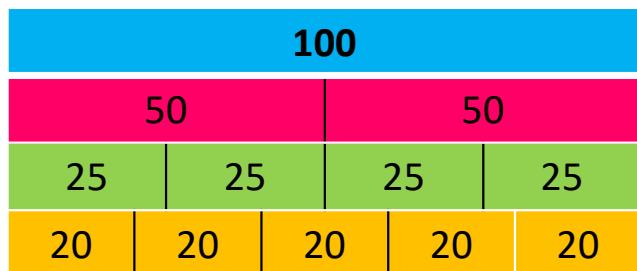


$$12 \div 4 = 3$$

$$12 \text{ tenths} \div 4 = 3 \text{ tenths}$$

$$1.2 \div 4 = 0.3$$

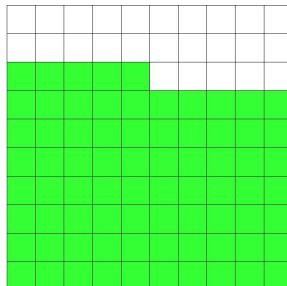
# Number Facts



$$1\% = \frac{1}{100} = 0.1$$

$$75\% = \frac{75}{100} = \frac{3}{4}$$

$\div 25$



$$75\% = \frac{75}{100} = 0.75$$

$\frac{1}{1}$	one	1.00	100%			1
$\frac{1}{2}$	one-half	0.50	50%			$\frac{1}{2}$
$\frac{1}{3}$	one-third	0.333	33.3%			$\frac{1}{3}$
$\frac{1}{4}$	one-fourth	0.25	25%			$\frac{1}{4}$
$\frac{1}{5}$	one-fifth	0.20	20%			$\frac{1}{5}$
$\frac{1}{6}$	one-sixth	0.166	16.6%			$\frac{1}{6}$
$\frac{1}{8}$	one-eighth	0.125	12.5%			$\frac{1}{8}$
$\frac{1}{10}$	one-tenth	0.10	10%			$\frac{1}{10}$

18
6   6   6

18
3   3   3   3   3   3

$$6 \times 3 = 18$$

$$3 \times 6 = 18$$

$$18 \div 6 = 3$$

$$18 \div 3 = 6$$

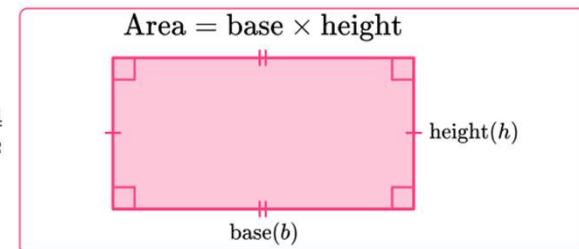
$$\frac{1}{6} \text{ of } 18 = 3$$

$$\frac{1}{3} \text{ of } 18 = 6$$

The area of a rectangle is the amount of space inside the rectangle.

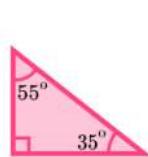


$$\text{Area} = 7 \times 4 = 28 \text{m}^2$$

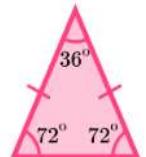


Angles in a triangle refers to the sum (total) of the angles at each vertex in a triangle. The sum of the interior angles of a triangle is **180°**.

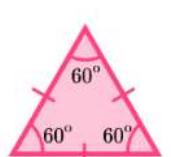
E.g.



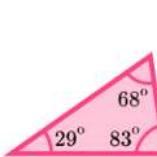
Right angled triangle  
One right angle  
 $90+55+35 = 180^\circ$



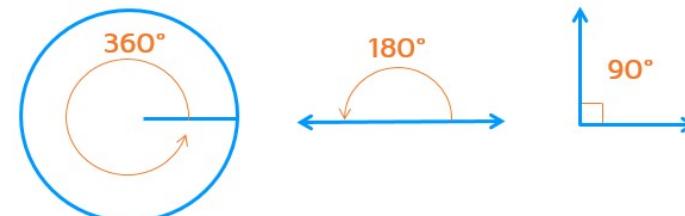
Isosceles triangle  
Two equal sides & angles  
 $72+72+36 = 180^\circ$



Equilateral triangle  
Three equal sides & angles  
 $60+60+60 = 180^\circ$



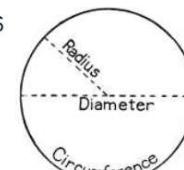
Scalene triangle  
All sides & angles different  
 $83+68+29 = 180^\circ$



$$360 \div 2 = 180$$

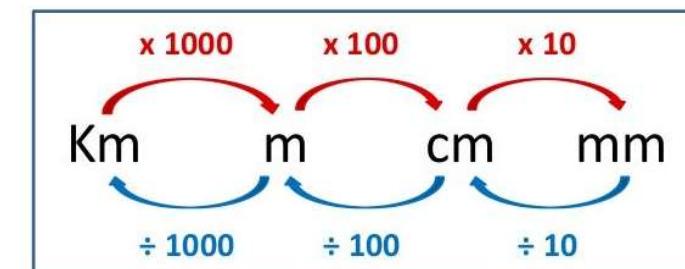
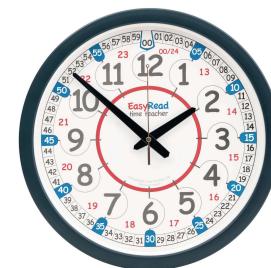
$$\frac{1}{2} \text{ of } 360 = 180$$

1 day = 24 hours  
1 hour = 60 minutes  
1 minute = 60 seconds



$$\text{Diameter} = 2 \times \text{radius}$$

$$\text{Radius} = \frac{1}{2} \text{ diameter}$$



$$5\text{km} = ?\text{m} \quad \text{Need to } \times 1000$$

$$120\text{cm} = ?\text{m} \quad \text{Need to } \div 100$$

$$5 \times 1000 = 5000\text{m} \quad \checkmark$$

$$120 \div 100 = 1.2\text{m} \quad \checkmark$$

## Time



$$1\text{cm} = 10\text{mm}$$

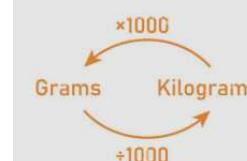
$$1\text{m} = 100\text{cm}$$

$$1\text{km} = 1000\text{m}$$

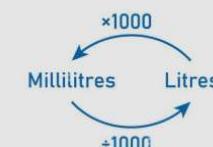
$$1\text{kg} = 1000\text{g}$$

$$1\text{l} = 1000\text{ml}$$

## Mass



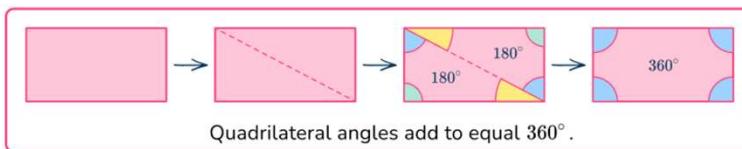
## Volume



Quadrilateral angles are the four angles that occur at each vertex within a four-sided shape; these angles are called **interior angles of a quadrilateral**.

The sum of the interior angles of a quadrilateral is **360°**.

You can prove this using the angle sum of a triangle.



This is the same for all types of quadrilaterals:

