

by 10 100 1000

- To **MULTIPLY** move the digits to the left

$$68 \times 10$$

Th H T U. t h th

6 8

6 8 0

- Move how ever many places there are zeros (10 has 1 zero, so move 1 place).
- Add a place holder if needed

- To **DIVIDE** move the digits to the right

$$36 \div 100$$

Th H T U. t h th

3. 6

0. 0 3 6

- Move how ever many places there are zeros (100 has 2 zeros, so move 2 places)
- Add place holders if needed.

# Bodmas

B O D M A S  
BRACKETS ORDERS  $\div$   $\times$  + -  
↓  
NOT GENERALLY  
USED IN Y6.

- Bodmas is also called the order of operations.
- It is used when there is more than 1 operation  $\div \times + -$  within one question.

$$8 - 1 \times 2 = 6$$

- The multiplication would come first
  - $1 \times 2 = 2$
  - You would then subtract
  - $8 - 2 = 6$
  - Some questions contain brackets
- $$10 \div (2 + 3) = 2$$
- Follow the BODMAS steps
  - Brackets first -  $2 + 3 = 5$
  - Then divide -  $10 \div 5 = 2$

# Column Addition

$$62391 + 14817$$

- First, write the numbers on top of each other. Make sure the place value lines up!

	TTh	Th	H	T	U
	6	2	3	9	1
+	1	4	8	1	7
	7	7	2	0	8

- Add up the totals, starting with the units.
- Carry numbers over to the next column.

## Decimals

- Use the same method as above.
- Make sure the place value lines up
- Add place holders if needed

$$24.2 + 1.467$$

Don't forget the decimal point in your answer.

	T	U.	t	h	th
	2	4	2	0	0
	0	1	4	6	7
	2	5	6	6	7

# Column Subtraction

$$473 - 24$$

- First, write the numbers on top of each other. Make sure the place value lines up!

	H	T	U
	4	<del>7</del>	3
-		2	4
<hr/>			
	4	4	9
<hr/>			

You might need to exchange if there is something you 'can't do'. Remember to borrow from next door.

- Starting with the column with the lowest place value, subtract the numbers. REMEMBER it is the top number take away the bottom number.

## Decimals

- Use the same method as above.
- Make sure the place value lines up
- Add place holders if needed

Don't forget the decimal point in your answer.

	T	U.	t	h
	<del>5</del>	1	<del>4</del>	0
-		2	3	7
<hr/>				
	3	9	0	3
<hr/>				

$$51.4 - 12.37$$

# Short Multiplication

$$45 \times 7$$

- Use short multiplication when multiplying by a one digit number or an 'easy' number such as 12 or 20
- Put the numbers on top of each other

$$\begin{array}{r} \phantom{x} \quad T \quad U \\ \phantom{x} \quad 4 \quad 5 \\ \phantom{x} \phantom{0} \quad 7 \\ \hline 3 \quad 1 \quad 5 \\ \hline \phantom{0} \quad 3 \phantom{0} \phantom{0} \end{array}$$

- Multiply the single digit by the number above. You might need to carry a number to the next column.
- Remember to add it on for the next calculation.
- Multiply the single digit by the number above in the next column & add on any number you have carried.
- Repeat these steps until the single digit has been multiplied by every digit above

# Long Multiplication

$$3015 \times 13$$

- Use long multiplication when dividing by a two digit number.

$$\begin{array}{r} 3015 \\ \times 13 \\ \hline 9045 \\ + 30150 \\ \hline 39195 \end{array}$$



- You multiply the unit of the bottom number by each digit of the top number. You might need to carry. Don't forget to add it on in the next calculation.
- **YOU MUST ADD A ZERO!**
- Repeat the steps but now multiply the second digit of the bottom number by each digit of the top number.
- Add the two answers together.

# Short Division

The number you are dividing is called the **dividend**

$$47 \div 3$$

The number you are dividing by is called the **divisor**

$$\begin{array}{r} 15 \text{ r} 2 \\ 3 \overline{) 47} \end{array}$$

- Divide each digit in the dividend by the divisor.
- Put the whole number on the top
- Carry any remainders over to the next digit.
- Don't forget the remainder in your answer if needed.
- Short division is used for single digit numbers, smaller numbers or 'easy' numbers.

# Long Division

$$374 \div 14$$

- Use long division when dividing by a two digit number.

1	$\times 14 = 14$
2	$\times 14 = 28$
3	$\times 14 = 42$
4	$\times 14 = 56$
5	$\times 14 = 70$
6	$\times 14 = 84$
7	$\times 14 = 98$
8	$\times 14 = 112$
9	$\times 14 = 126$
10	$\times 14 = 140$

COMPLETE THE STEPS  
IN THIS ORDER

$$\begin{array}{r} 026r10 \\ 14 \overline{) 374} \\ \underline{-28} \phantom{0} \\ 094 \\ \underline{-84} \\ 10 \end{array}$$

- Start by jotting down the times table of the number you are dividing by.
- Divide each digit of the dividend by the divisor.
- Put the answer on the top and the multiplication underneath, then take it away and bring down the next digit of the dividend.

Does  $\downarrow$  Divide  
McDonald's  $\downarrow$  Multiply  
Serve  $\downarrow$  Subtract  
Burgers  $\downarrow$  Bring Down

# Percentage of Amounts

- Some percentages are easy to find.
- To find 50%. you  $\div$  by 2
- To find 10%. you  $\div$  by 10
- To find 25%. you  $\div$  by 2, then  $\div$  by 2 again
- You can use a combination of these to find other percentages.

find 75% of 20 = 15

- find 50% by dividing by 2 ( $20 \div 2 = 10$ )
- find 25% by dividing by 2 again ( $10 \div 2 = 5$ )
- Add together your totals ( $10 + 5 = 15$ )

50%  $\swarrow$   $\searrow$  25%  $\rightarrow$  75%

- Some percentages are trickier to find!
- Divide by 100 to get 1%. then multiply by the percentage you are trying to find

find 45% of 120 = 54

- Divide by 100 to find 1%. ( $120 \div 100 = 1.2$ )
- Multiply by 45 to find 45%. ( $1.2 \times 45 = 54$ )

# Fraction of Amounts

$$\frac{3}{4} \text{ of } 36 = 27$$

- Divide the **denominator** by the number  
 $36 \div 4 = 9$
- Multiply the answer by the **numerator**  
 $9 \times 3 = 27$

# Square and Cube Numbers

## SQUARE NUMBERS

◦ When you multiply a number by itself you get a square number.

◦ Here are the first few

1	4	9	16
(1x1)	(2x2)	(3x3)	(4x4)

◦ They are written like this:

$2^2$	$4^2$	$5^2$
↙	↓	↘
2 squared	4 squared	5 squared
4	16	25

## CUBE NUMBERS

◦ You get a cube number when you multiply a number by itself, then itself again

◦ 3 cubed =  $3 \times 3 \times 3 = 27$ . • 5 cubed =  $5 \times 5 \times 5 = 125$

◦ They are written like this:

$3^3$	$4^3$	$5^3$
↙	↓	↘
3 cubed	4 cubed	5 cubed
27	64	125

# Inverse

- Remember the value on each side of the equals sign is the same.

$$10 + ? = 302$$

↙  
This needs to equal 302

- We can use the inverse to check

$$302 - 10 = 292$$

$$10 + 292 = 302$$

- Remember the inverse of  $+$  is  $-$   
and the inverse of  $\times$  is  $\div$ .

# Simplify Fractions

- Find the highest common factor

$$\frac{12}{30}$$

$$12 = 1 \ 2 \ 3 \ 4 \ 6 \ 12$$

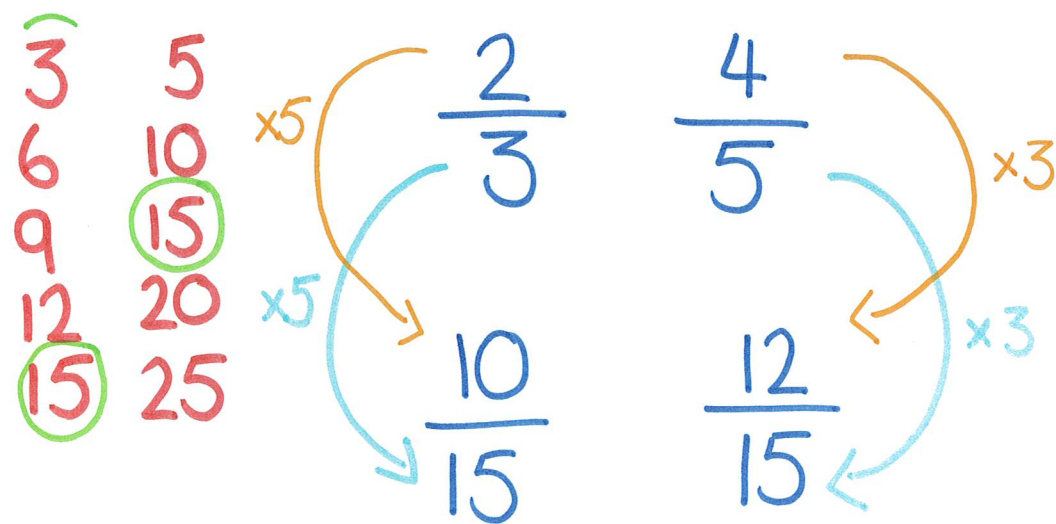
$$30 = 1 \ 2 \ 3 \ 5 \ 6 \ 10 \ 15$$

- Divide the numerator and denominator by the highest common factor

$$\frac{12}{30} \div 6 = \frac{2}{5}$$

# Comparing Fractions

- To add, subtract or compare fractions, they have to be the same denominator - they need converting.
- You need to find the **LOWEST COMMON MULTIPLE** - this will be the new denominator



- Whatever has been done to the denominator, you do to the numerator.

# Divide Fractions

- To divide a fraction by a whole number you **MULTIPLY** the denominator by the whole number

$$\frac{3}{5} \div 4$$

- The numerator stays the same
- You multiply the denominator by the whole number

$$(5 \times 4) \rightarrow \frac{3}{20}$$

- Remember to check if your answer needs to be simplified.

# Multiply Fractions

## FRACTION x FRACTION

- Simply multiply the numerators together
- Then multiply the denominators together

$$\begin{array}{l} 1 \times 2 \\ 4 \times 3 \end{array} \quad \frac{1}{4} \times \frac{2}{3} = \frac{2}{12} \text{ OR } \frac{1}{6}$$

- Check if your answer can be simplified

## FRACTION x WHOLE NUMBER

- Add 1 as the denominator and repeat the same steps as above

$$\begin{array}{l} 2 \times 4 \\ 3 \times 1 \end{array} \quad \frac{2}{3} \times \frac{4}{1} = \frac{8}{3} \text{ OR } 2\frac{2}{3}$$

- Check if your answer needs converting to a mixed number.

## FRACTION x MIXED NUMBER

- Convert the mixed number into an improper fraction and repeat the same steps

$$1\frac{3}{4} \times 10$$

$$\begin{array}{l} 7 \times 10 \\ 4 \times 1 \end{array} \quad \frac{7}{4} \times \frac{10}{1} = \frac{70}{4} \text{ OR } 17\frac{1}{2}$$

# Add + Subtract Fractions

## SAME DENOMINATOR

- Add numerators only!  $\frac{5}{9} + \frac{8}{9} = \frac{13}{9}$  OR  $1\frac{4}{9}$
- If the answer is an improper fraction, turn it into a mixed number.
- Or check if it can be simplified.

## DIFFERENT DENOMINATOR

$$\begin{array}{r} \times 5 \\ \frac{3}{4} - \frac{3}{10} \\ \hline \frac{15}{20} - \frac{6}{20} \\ \hline \frac{9}{20} \end{array}$$

- find the lowest common multiple

$$\begin{array}{cccccc} 4 & 8 & 12 & 16 & \textcircled{20} \\ 10 & \textcircled{20} & 30 & 40 & 50 \end{array}$$

- This is your new denominator

- Whatever has been done to the denominator, you do to the numerator.
- Repeat the steps.

## MIXED NUMBERS

$$\textcircled{2}\frac{\textcircled{1}}{\textcircled{2}} + \frac{2}{3} \quad \textcircled{5} + \frac{2}{3} \quad \frac{15}{6} - \frac{4}{6} = \frac{11}{6} = 3\frac{1}{6}$$

- Convert mixed numbers to improper fractions
- To do this, multiply the whole number by the denominator  $2 \times 2 = 4$
- Add the numerator  $4 + 1 = \textcircled{5}$
- Repeat the steps