HALEWOOD ACADEMY
WADE DEACON TRUST

Year 7

Term 1

Knowledge Organiser

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Year 7 Knowledge Organiser DATA

What do I need to be able to do?

- Understand how to represent the number 5 in a tally.
- Calculate the mode, median, range and mean of a list of data.
- Complete and read information from a pictogram.
- Draw and read a bar chart.

Key Words

Mean: Add all of the numbers together and divide by how many there were.
Range: The biggest number subtract the smallest number.
Mode: The value there the most times.
Median: The middle number when they are in order.
Frequency: The number which tells us how many pieces of data there are.

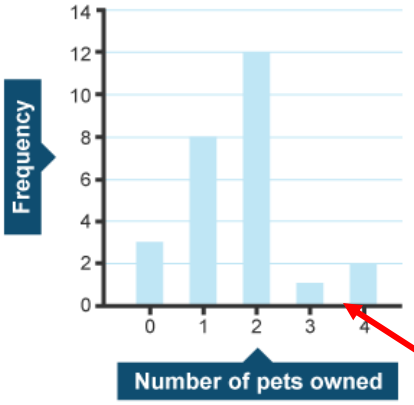
Tally Charts

Tally marks are used to help count things. Each vertical line represents one unit. The fifth tally mark goes down across the first four to make it easier to count. The frequency column is completed after all the data has been collected.

You must represent 5 like this.

Eye Colour	Tally	Frequency
brown	𝍸 |	6
blue	𝍸 |||	8
green	|||	3
grey	|||	4
hazel	𝍸	5

Bar Charts



A bar chart has a horizontal axis and a vertical axis. The x axis is for the type of data and the y axis shows the frequency. The bars show the data value of each category. There must be a gap between each bar and the scale must increase in the same sized intervals and the axes must be labelled.

You must include gaps and labels.

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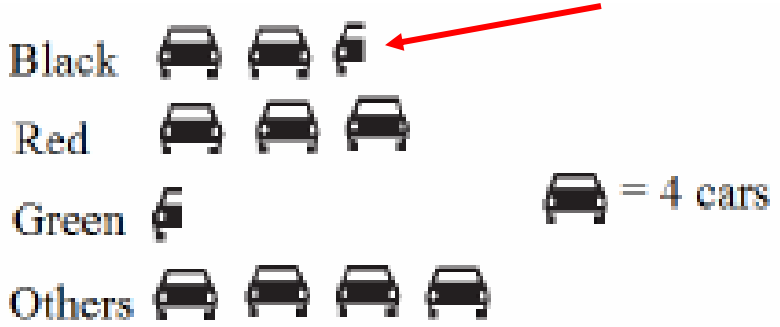
Year 7 Knowledge Organiser DATA

Pictograms

Pictograms are similar to bar charts, but the data is shown in pictures. A pictogram must have a key so that you know what a full image represents.
Looking at this diagram:
Black = 4 + 4 + 2 = 10 cars
Red = 4 + 4 + 4 = 12 cars
Green = 2 cars
Others = 4 + 4 + 4 + 4 = 16 cars

This represents 2 cars because it is half of the diagram in the key.



Interpreting data

Information can be show in tables, charts or graphs. Interpreting data simply means understanding or working out what is being shown by a table, graph or chart and being able to answer questions about that information.

Average and Range

Here is a list of numbers: 12, 15, 10, 8, 15

Mean: The mean is the average of a set of data.
Add all of the values together 12 + 15 + 10 + 8 + 15 = 60
Divide this by the number of values in your list 60 ÷ 5 = 12
The mean of this data is 12.

Mode: This is the value that appears the most times in the list. So if we look at the list above then the mode would be 15 because 15 appears twice in the list.

Range: This is the difference between the biggest and smallest numbers in the list.
15 – 8 = 7 so the range for the list above is 7.

Median: This is the middle number but only when the list is in order from smallest to biggest.

This is in the middle so it must be the median.

8 10 12 15 15

12 is in the middle of the list so the median must be 12.

Year 7 Knowledge Organiser NUMBER SKILLS

What do I need to be able to do?

- Add and subtract numbers using the column method.
- Multiply numbers using a suitable written method.
- Divide numbers using the bus stop method.
- Calculate with directed numbers.
- Round values to a suitable degree of accuracy.

Key Words

Add: Finding the total of 2 or more number.
Subtract: Finding the difference between 2 numbers.
Multiply: Increasing a value by a given times table.
Divide: Share a given number using a specific times table.
Directed numbers: Positive and negative numbers.
Round: Changing the given number to a value that it is close to.

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Column addition and subtraction

	4	5	8	6	4
+	2	3	4	9	7
	6	9	3	6	1
		1	1	1	

Addition: Starting with the ones, add each column in turn. Regroup tens, hundreds etc as required.

	3	5	~~7~~ 6	~~14~~ 13	~~2~~ 1
-		3	4	7	6
	3	2	2	6	6

You must remember to borrow if you can't subtract with the numbers you have.

Subtraction: Starting with the ones, subtract each column in turn. Exchange tens, hundreds etc as required.

1	~~3~~	~~2~~	
	1	5	4
×		2	6
	9	2	4
3	0	8	0
4	0	0	4
1	1		

Multiplication: Starting with the ones multiply separately each value in the top row. When moving to the tens, hundreds etc remember to add in the correct number of zeros to reflect its value. When you have finished multiplying add your totals together.

Remember to add in one zero when moving to the tens column to reflect its value.

Year 7 Knowledge Organiser NUMBER SKILLS

Division

Division: Set up your question as shown. Starting from the left divide the number under the bus stop by the number on the outside. Any remainders must be carried to the next value along. Continue this process until you have got to the end of the number you are dividing.

You must carry any remainders here.

Start from the left.

		4	4	0	5
12	5	2	8	6	0
		5	4	6	

5 ÷ 12 = 0 r5
52 ÷ 12 = 4 r4
48 ÷ 12 = 4
6 ÷ 12 = 0 r6

Rounding

To make a number simpler but keep its value close to what it was.
If the digit to the right of the rounding digit is less than 5, round down. If the digit to the right of the rounding digit is 5 or more, round up.
For example, 74 round to the nearest ten is 70, because 74 is closer to 70 than 80.

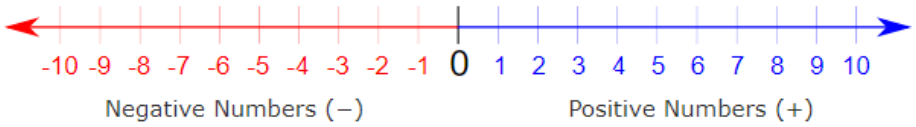
Always read what you are asked to round to carefully.

Rounding to the nearest 1000

Directed numbers

Directed numbers: This refers to both positive and negative numbers/integers.

- \- is used in front of an integer if it is negative
- \+ is sometimes used in front of an integer if it is positive but not always



To calculate with negative numbers we must follow the following rules:

	Rule	Example
+(+) −(−)	Two like signs become a **positive sign**	3+(+2) = 3 + 2 = 5 6−(−3) = 6 + 3 = 9
+(−) −(+)	Two unlike signs become a **negative sign**	7+(−2) = 7 − 2 = 5 8−(+2) = 8 − 2 = 6

There won't always be brackets in the question but it doesn't change the meaning.

Positive integers won't always have + in front of them.

Year 7 Knowledge Organiser EXPRESSIONS & FORMULAE

What do I need to be able to do?

- Simplify expressions by collecting like terms.
- Write an expression from a given sentence.
- Expand a single bracket.
- Substitute into an expression or formula.

Key Words

Formula: A rule written using symbols that describe a relationship between different quantities.
Expression: Shows a mathematical relationship whereby there is no solution.
Equation: A mathematical statement that shows that two expressions are equal.
Term: This is a number and a letter put together, for example 3x is a term.

Expanding brackets

Each term inside the bracket it multiplied by this value.

$$2(3a - 4)$$
$$= 6a - 8$$
$$= 6a - 8$$

Expanding: To expand a bracket you multiply each term on the inside of the bracket by the term on the outside of the bracket. It is very important that you multiply all of the terms.

Simplifying expressions

The operation symbol in front of the term tells you what to do.

Simplify:

$$4a + 3b - a + 2b$$
$$= 3a + 5b$$

Collecting like terms: You can only collect terms with the same letter together. The 'a' terms can only be collected with other 'a' terms. The operation symbol in front of the terms tells you what to do with it.

Expand and simplify:

$$2(4a + 2b) - 2(a + 3b)$$
$$8a + 4b - 2a - 6b$$
$$6a - 2b$$

Expanding and collecting like terms: You need to first expand the brackets separately and then collect the terms with the same letter like you would in the previous question.

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Year 7 Knowledge Organiser EXPRESSIONS & FORMULAE

Expressions

Expression: An expression is a group of numbers, letters and operation symbols. It is important that you read the words carefully and work out their meaning before deciding on the most suitable operation. It never has an equals sign.

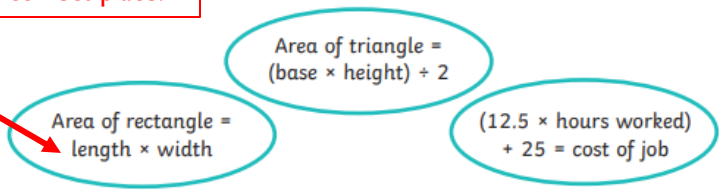
More than = add
Less than = subtract
Always check the wording carefully.

Add 14 to a	$a + 14$
Subtract 20 from b	$b - 20$
Multiply c by 4	$4c$
12 more than d	$d + 12$
Multiply e by 3 and subtract 5	$3e - 5$
Add 12 to f and then multiply by 2	$2(f + 12)$

Formulae

Formulae: The word formula has two possible plural forms, formulae and formulas.
A formula is a special type of equation that shows the relationship between different variables. Formulae are often used in geometry topics to find area and volume.

Values would be substituted into the formula in the correct place.



Equations

Equation: An equation is a number statement with an equals sign. Expressions on either side of the equals sign are of equal value. There is always a solution or answer to an equation.

To solve the equation you would then do the inverse of the calculation you can see. Inverse means the opposite.

$d + 12 = 30$
$d = 30 - 12$
$d = 18$

$a + 14 = 20$
$b - 20 = 15$
$4c = 28$
$d + 12 = 30$
$3e - 5 = 10$
$2(f + 12) = 44$

Substitution

Substitution: This is where we replace the letter we see for the number that it is worth.

Remember that 3y means 3 multiplied by the value of y.

For example: If w = 6 and y = 5

a) $w + 5 = 6 + 5 = 11$

b) $3y - 2 = 3 \times 5 - 2 = 15 - 2 = 13$

c) $8w + 2y = 8 \times 6 + 2 \times 5 = 48 + 10 = 58$

Year 7 Knowledge Organiser DECIMALS

What do I need to be able to do?

- Add and subtract decimals using the column method.
- Multiply decimals by whole numbers and decimals by decimals using a written method.
- Divide decimals using the bus stop method.
- Use rounding to estimate values to calculations.
- Order decimals from smallest to biggest.

Key Words

Add: Finding the total of 2 or more number.
Subtract: Finding the difference between 2 numbers.
Multiply: Increasing a value by a given times table.
Divide: Share a given number using a specific times table.
Decimal: A number that has digits that are smaller than one whole. It has a decimal point.
Round: Changing the given number to a value that it is close to.

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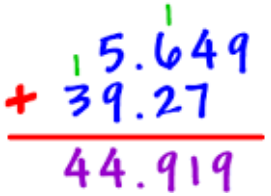
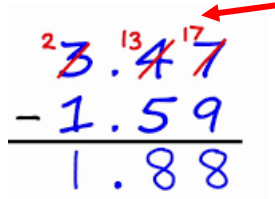
Column addition and subtraction



Addition: Starting with the digit on the right, add each column in turn. Regroup tenths, tens, hundreds etc as required.

You must remember to borrow if you can't subtract with the numbers you have.



Subtraction: Starting with the digit on the right, subtract each column in turn. Exchange tenths, tens, hundreds etc as required.

Column multiplication

Question: 1.54 x 2.6
Now 154 x 26

1	3	2	
	1	5	4
×		2	6
	9	2	4
3	0	8	0
4	0	0	4
1	1		

We multiplied by 1000 to get rid of the decimal points because there are 3 numbers in total after the point in the question.

Multiply the whole numbers.

Divide your answer by 1000.

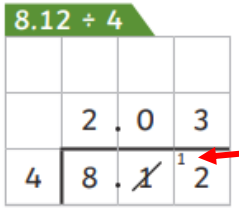
Answer = 4.004

Multiplication: Remove any decimal points from your values before multiplying. Then multiply as you would normally. When you have finished multiplying and have added to get your total remember to then divide by the multiple of 10 that you multiplied by to remove the decimal point at the beginning.

Year 7 Knowledge Organiser DECIMALS

Division

Division: Set up your question as shown. Starting from the left divide the number under the bus stop by the number on the outside. Any remainders must be carried to the next value along. Continue this process until you have got to the end of the number you are dividing.



You must carry any remainders here.

Rounding decimals

To make a number simpler but keep its value close to what it was.

If the digit to the right of the rounding digit is less than 5, round down. If the digit to the right of the rounding digit is 5 or more, round up.

For example:

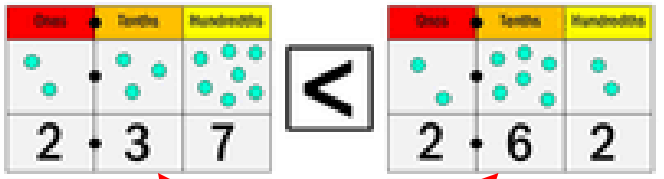
7.44 rounded to 1 decimal place is 7.4, because 7.44 is closer to 7.4 than 7.5.

0.38 rounded to 1 decimal place is 0.4 because 0.38 is closer to 0.4 than 0.3.

Always read what you are asked to round to carefully.

Comparing and ordering decimals

Comparing decimals: It is important when comparing decimals to compare each digit which is in the same place value. For example, compare the tenths with each other because they are in the same place.



Compare the tenths – 3 is less than 6 so we know that 2,37 must be smaller than 2.62.

Ordering decimals: When ordering decimals it is important to ensure that all of the decimals have the same number of digits.

For example:

0.3, 0.43, 0.03, 0.043 would become 0.300, 0.430, 0.030, 0.043

It is then easy to order them: 0.03, 0.043, 0.3, 0.43

You must only use the additional zeros to help you order the decimals, they must be written as they were in the question as your answer.