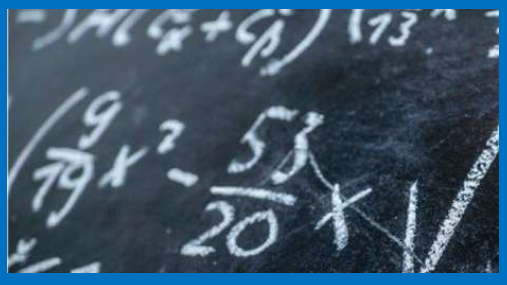
THE DUSTON SCHOOL 4-19
Knowledge itself is power

Year 7 Maths
Knowledge Organiser
Term 6

Name:	Class:

Keyword	Definition
Median	The middle number in an ordered list.
Range	The difference between the smallest and largest values in a data set.
Mean	The sum of all the data divided by how many data there are.
Mode	The most common piece of data.
Average	An indication of the typical value.
Qualitative	Data which is non-numerical.
Quantitative	Data which is numerical.
Discrete	Data which can only take certain values in a range.
Continuous	Data which can take any value in a range.
Frequency	How often something happens
Systematic	Involving a method or plan.
Outcome	A possible result of an experiment.
Mutually exclusive	Describes two events which cannot happen together.
Relative frequency	An estimate of probability based on observation or experiment.
Experiment	A procedure that can be repeated which has a well-defined set of outcomes.
Event	A set of outcomes of an experiment.
Probability	The likelihood of something happening.
Sample Space diagram	A diagram showing all the possible outcomes of an experiment.
Median	The middle number in an ordered list.
Range	The difference between the smallest and largest values in a data set.

Homework 1 due:	
Homework 2 due:	
Homework 3 due:	



RESPECT

In Mathematics, a classroom environment should always be respectful. Students can show respect through:

- **Supporting each other with their learning.** Pupils should recognise that every individual has their own strengths and weaknesses and, as a class, we should 'up-lift' students.
- **Students should not be felt to be rushed by others in the classroom**. Respect that all students have different experiences and therefore will access the knowledge at different rates.
- **Being Polite.** As no different to the rest of school. Students should embrace diversity and treat all others with tolerance and decency.

ASPIRATION

- **Building logical processes.** Understanding that learning mathematical concepts improves our logical reasoning which improves other aspects of our lives: language, culture, games etc. the essence of mathematics is in respect of ideas, structures and relationships by logical reasoning.
- **Every day needs.** Understanding that being numerate, along with literate, is a strong indicator of long-term success and students' ability to climb the tree of knowledge.

RESILIENCE

- **I don't know it… yet.** Understanding that maths can be abstract and that, as with anything new, it will take time to learn. With time, you will succeed.
- **Mathematical concept won't always come easily.** Understanding that getting things wrong is a frustrating and not pleasant feeling but, to succeed, it is a passage we need to go through.
- **Practice makes permanent.** Mathematics is a logical subject such that, rehearsal and repetition of method is the key to being successful and committing the knowledge to long-term memory. This process takes time and will come with failures along the way which we must persevere through.

Term 6 Overview

Big Questions for the term

Data

- How can we record data?
- What is an average?
- How can we compare data using a bar chart?
- How do we use a stem and leaf diagram?
- How does a Pie Chart represent Data?
- What is a set?
- How can we use Venn diagrams to categorise numbers and objects?

Probability

- How do we represent probabilities of events?
- How do we systematically list the outcomes of an experiment
- What does it mean for events to be mutually exclusive?

Knowledge Retrieval Questions – From Term 6

Unit 9 – Data

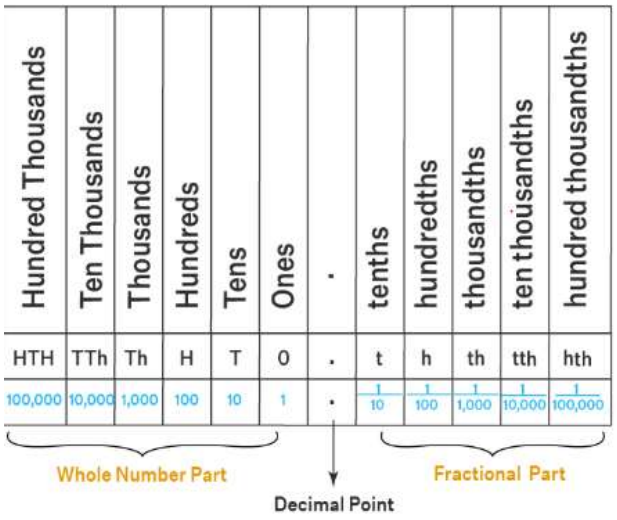
#	Question	Answer
1	How do you find the mean of a set of data?	Divide the total of the values by the number of values
2	How do you find the mode of a set of data?	Identify the most frequent piece of data
3	What is qualitative data?	Data which isn't in numeric form.
4	What is quantitative data?	Data which is in numeric form.
5	What is discrete data?	Quantitative data which can only take certain values.
6	What is continuous data?	Quantitative data which can take any value.

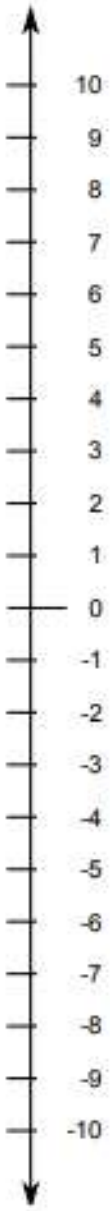
Unit 10 – Probability

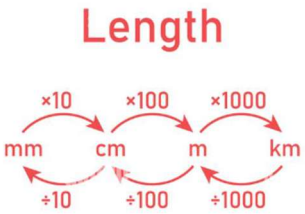
#	Question	Answer
1	What is the sum of the probabilities of all possible outcomes?	1
2	State the ways you can give the probability of something happening.	Fraction, decimal and percentage.
3	What does it mean if A and B are mutually exclusive?	They cannot both occur.
4	How do you work out the probability of an outcome as a fraction?	The numerator is the number of ways of it happening and the denominator is the total.

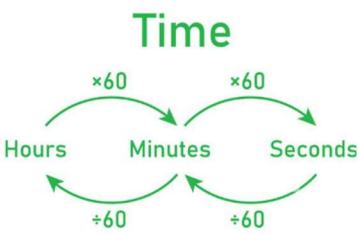
Multiplication Chart

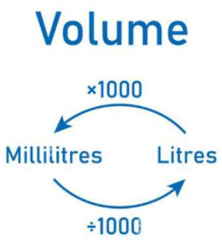
X	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

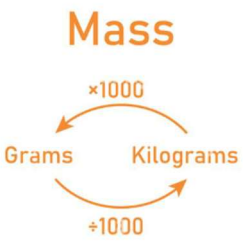












Remote-Learning

If you are absent from school, lesson work can be found on your year group Teams channel: files -> class materials -> maths

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This website is useful to students as it contains videos to support students understanding and also extra questions to extend and support students.

Please see your class teacher for any login issues

vle.mathswatch.co.uk

Username: firstnamesurname@dustonschool

Password: berrywood

Term 6 Homework 1

#	Type	Question	Answer
1	Knowledge	How is division represented algebraically?	As a fraction
	Application 1	How do you write b divided by 5 algebraically?	
	Application 2	How do you write 18 divided by c algebraically?	
2	Knowledge	In algebra, what is substitution?	Replacing something in an expression with something else which is equal to it
	Application 1	Evaluate 9x + 2y, if x = 3 and y = 5	
	Application 2	Evaluate 5x + 2y, if x = 11 and y = 18	
3	Knowledge	How do you work out the height of a triangle if you know the area and the base length?	2 x Area ÷ Base length
	Application 1	Calculate the height of a triangle with an area of 40cm² and a base length of 5cm.	
	Application 2	Calculate the height of a triangle with an area of 5cm² and a base length of 5cm.	
4	Knowledge	How do you work out the perimeter of a 2D shape?	Add all the edge lengths
	Application 1	Calculate the perimeter of a rectangle with dimensions 9cm and 2cm.	
	Application 2	Calculate the perimeter of a rectangle with dimensions (3a) cm and (5a) cm.	

#	Type	Question	Answer
5	Knowledge	What is the formula for calculating the area of a rectangle?	Area = base × height
	Application 1	Calculate the area of a rectangle with dimensions 9cm and 2cm.	
	Application 2	Calculate the area of a rectangle with dimensions 15cm and 20cm.	

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6	Knowledge	State the properties of a square.	4 edges, all equal length, 4 right angles.
	Application	Label the square using the appropriate symbols.	

7	Knowledge	What is the formula for working out the area of a parallelogram?	Area = base × height
	Application 1	Calculate the area of a paralellogram with dimensions 4cm and 3cm.	
	Application 2	Calculate the area of a paralellogram with dimensions 11cm and 19cm.	

8	Knowledge	How do you calculate best value?	Work out the cost of the same amount for each option and compare those.
	Application 1	SHOW which is better value, Shop A: 5 pens for 15p, or Shop B: 7 pens for 14p	
	Application 2	SHOW which is better value, Shop A: 18 pens for 36p, or Shop B: 20 pens for 240p?	

#	Type	Question	Answer
9	Knowledge	How do you write expressions from sentences?	Replace unknown numbers with letters, everything else should be a number or an operation
	Application 1	Write '3 lots of a number minus 5' as an expression.	
	Application 2	Write '15 more than k' as an expression.	

10	Knowledge	How do you work out the height of a rectangle if you know the area and the base length?	Area ÷ Base length
	Application 1	Calculate the height of a rectangle with an area of 15cm² and a base length of 5cm.	
	Application 2	Calculate the height of a triangle with an area of 36cm² and a base length of 18cm.	

11	Knowledge	How do you simplify a ratio?	Divide both numbers by a common factor.
	Application 1	Fully simplify 6:30	
	Application 2	Fully simplify 30:108	

12	Knowledge	State the properties of a parallelogram.	Quadrilateral with 2 pairs of parallel edges.
	Application	Label the paralellogram, using the appropriate symbols.	

Term 6 Homework 2

#	Type	Question	Answer
1	Knowledge	What does the word product mean?	The result of a multiplication.
	Application 1	What is the product of 6 and 9?	
	Application 2	What is the product of 7 and 11?	
2	Knowledge	How do you divide a number by 10?	Move all the digits 1 place to the right
	Application 1	Calculate 96 divided by 10.	
	Application 2	Calculate 160 divided by 10.	
3	Knowledge	What should your answer be if the question tells you to evaluate?	A number
	Application 1	Evaluate 96 + 46	
	Application 2	Evaluate 160 + 132	
4	Knowledge	How do you convert kilograms into grams?	Multiply by 1000
	Application 1	Convert 2.1kg into grams	
	Application 2	Convert 17.4kg into grams	

#	Type	Question	Answer
5	Knowledge	How do you convert millimetres to metres?	Divide by 1000
	Application 1	Convert 4600mm into metres	
	Application 2	Convert 11500mm into metres	

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6	Knowledge	How do you multiply fractions?	Multiply the numerators and multiply the denominators
	Application 1	Calculate 1/20 × 6/10	
	Application 2	Calculate 15/18 × 2/3	

7	Knowledge	What does the word sum mean?	The result of addition.
	Application 1	What is the sum of 7 and 1?	
	Application 2	What is the sum of 12 and 15?	

8	Knowledge	What is the definition of a square number?	The product of a number and itself
	Application 1	What is the 5th square number?	
	Application 2	What is the 20th square number?	

#	Type	Question	Answer
9	Knowledge	How do you find the difference between two numbers?	Subtract the smaller number from the larger one.
	Application 1	What is the difference between 96 and 21?	
	Application 2	What is the difference between 160 and 174?	

10	Knowledge	What is a linear sequence?	A number pattern which increases or decreases by the same amount each time.
	Application 1	Is the following sequence linear? 2, 4, 9, 11	
	Application 2	Is the following sequence linear? 20, 40, 62, 82	

11	Knowledge	How do you convert metres to kilometres?	Divide by 1000
	Application 1	Convert 6400m into km	
	Application 2	Convert 19400m into km	

12	Knowledge	What is a term-to-term rule?	A rule telling you how to get from one term to the next in a sequence
	Application 1	What is the term-to-term rule in the following sequence 7, 8, 9, 10, 11?	
	Application 2	What is the term-to-term rule in the following sequence 12, 27, 42, 57, 72?	

Term 6 Homework 3

#	Type	Question	Answer
1	Knowledge	What is the unitary method?	A method where the first step is making the ratio 1:n
	Application 1	9 pens cost 135p. Work out the cost of 10 pens.	
	Application 2	15 pens cost 300p. Work out the cost of 16 pens.	
2	Knowledge	State the two properties of a trapezium.	Quadrilateral with one pair of parallel edges
	Application	Label the trapezium, using the appropriate symbols.	
3	Knowledge	How do you share an amount in a ratio?	Add the ratio numbers and divide by that to get the value of each part.
	Application 1	Share 63 into the ratio 2:5	
4	Knowledge	What are the properties of a rectangle?	Quadrilateral with 2 pairs of parallel edges and 4 right angles
	Application	Sketch a rectangle, using the appropriate symbols.	
5	Knowledge	What is a vertex?	A point where edges meet
	Application	Sketch a shape and draw an arrow pointing to a vertex.	

#	Type	Question	Answer
6	Knowledge	What is the formula for calculating the area of a trapezium?	Area = ½ × (a+b) × height
	Application 1	Calculate the area of this trapezium: 2 parallel edges with lengths of 5 cm and 11 cm. Two diagonal lines of length 4 cm and 5 cm and a height of 3 cm.	
	Application 2	Calculate the area of this trapezium: 2 parallel edges with lengths of 8 cm and 10 cm. Two diagonal lines of length 5 cm and 6 cm and a height of 4 cm.	
7	Knowledge	In algebra, what does "collecting like terms" mean?	Adding or subtracting terms with the exact same letters
	Application 1	Simplify the following expression: 10p + 9q - 2p + 3q	
	Application 2	Simplify the following expression: 20p + 15q - 20p + 11q	
8	Knowledge	What is the formula for calculating the area of a triangle?	1/2 x base x height
	Application 1	Calculate the area of a triangle with dimensions 9cm and 2cm.	
	Application 2	Calculate the area of a triangle with dimensions 15cm and 20cm.	
9	Knowledge	How do you subtract decimals?	Same method as usual, lining up the decimal points
	Application 1	What is the difference between 0.64 and 4.6	
	Application 2	What is the difference between 1.94 and 11.5	

#	Type	Question	Answer
10	Knowledge	What is the definition of a prime number?	A number with only 2 factors.
	Application 1	Is the number 7 prime?	
	Application 2	Is the number 12 prime?	
11	Knowledge	What does HCF stand for?	Highest Common Factor
	Application 1	What is the HCF of 24 and 24?	
	Application 2	What is the HCF of 115 and 100?	
12	Knowledge	What does percent mean?	Out of 100
	Application 1	Write 64% as a fraction.	
	Application 2	Write 194% as a fraction.	

Careers in Maths

Airline Pilot

Airline pilots fly passengers and cargo to destinations around the world.

Your day-to-day tasks could include:

- carrying out pre-flight checks of instruments, engines, fuel and safety systems
- working out the best route using weather reports and information from air traffic control
- following instructions from air traffic control
- checking data during the flight and adjusting the route where necessary
- telling passengers and crew about journey progress
- writing reports about in-flight issues

On flights taking a short amount of time (short haul flights), you'll usually work in a two-person team, as pilot (captain) or co-pilot (first officer).

On long haul flights, you'll often have a flight engineer on board, to check the instruments.

You might also work in crop spraying, flight testing and flight training.

Working Hours and Environment

Your working hours will depend on the flying time for each destination.

On UK and European flights, you'll usually be able to return home each day. Longer flights may mean that you need to spend one or two nights away from home. Early starts and late nights are common, as are irregular work schedules.

Entry Requirements

You'll need to complete a pilot training course to get your license, like the Airline Transport Pilot Licence (ATPL). Some passenger airlines have their own pilot training schemes, where you can train with the company to get your licence.

Pilot training usually costs between £60,000 and £90,000, but bursaries and scholarships are available.

Skills Required:

You'll need:

- excellent hand-to-eye co-ordination
- excellent communication skills
- leadership skills
- problem-solving skills
- the ability to remain calm and focused under pressure

Find out more about careers on **UNIFROG**

Maths for Fun

I	E	B	E	O	R	A	E	L	R	S	L	E
P	S	M	I	L	V	I	U	P	B	A	P	B
E	N	E	L	B	I	S	S	O	P	M	I	L
O	C	P	A	L	U	B	O	L	T	P	P	N
E	L	B	O	U	T	C	O	M	E	L	L	E
S	E	V	E	N	C	H	A	N	C	E	B	L
H	L	U	S	L	I	C	O	T	E	S	T	O
Y	T	I	L	I	B	A	B	O	R	P	A	L
E	N	N	K	K	L	A	T	S	U	A	O	A
R	E	O	O	E	E	K	B	R	S	C	I	S
P	V	R	T	L	L	E	Y	O	E	E	P	E
H	E	V	C	Y	C	Y	A	P	R	C	Y	U
I	Y	H	M	N	T	I	C	R	B	P	S	I

EVEN CHANCE
EVENT
IMPOSSIBLE
LIKELY
OUTCOME
PROBABILITY
PROBABLE
SAMPLE SPACE
SURE
UNLIKELY

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Place the numbers 1-9 in every column, row and group of 9 squares (shown by the bold lines). You cannot have repeats in each one.

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