

Year 8 Maths

Knowledge Organiser

Term 4

Name:	Class:
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Keyword	Definition
Area	A measure of 2D size.
Perimeter	The length around the outside of a 2D shape.
Compound shape	A shape made by combining other shapes.
Grid	A set of horizontal and vertical lines.
Term	In sequences, a term is one of the elements in the sequence.
Sequence	A list of elements in a special order.
Linear/arithmetic	A type of sequence where the difference between terms is constant.
Quadratic	A type of sequence where the second difference between terms is constant.
Gradient	The change in the y coordinate for every 1 moved along the x axis (how steep it is)
Intercept	When two or more things meet.
Quadrants	On a coordinate grid, the 4 quadrants are the sections separated by the axes.

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



Term 4 Overview

Big Questions for the term

Area, perimeter and volume

- How can we work out the circumference of a circle?
- How can we work out the area of a circle?
- What is a prism?
- How do nets help us with Surface Area?
- How is Volume different from Surface Area?
- How can we work out the volume of prisms?
- What are the conversions of units in 2 and 3 dimensions?

Sequences, functions and graphs

- What Types of Sequences are there?
- How can algebra help us with formulating nth term?
- How can we describe position and lines on graphs?
- How does a table of values help me with plotting graphs?
- What is and how can we work out the gradient?
- How can we work out the equation of a straight line?

Knowledge Retrieval Questions – From Year 7

Unit 1 – Calculations and Accuracy

#	Question	Answer
1	What does the word sum mean?	The result of addition.
2	What does consecutive mean?	Following each other continuously.
3	How do you find the difference between two numbers?	Subtract the smaller number from the larger one.
4	What should your answer be if the question tells you to calculate?	A number
5	What should your answer be if the question tells you to evaluate?	A number
6	How do you divide a number by 10?	Move all the digits 1 place to the right
7	How do you multiply a number by 10?	Move all the digits 1 place to the left
8	What is subtracting a negative number equivalent to?	Adding a positive number
9	What is adding a negative number equivalent to?	Subtracting a positive number
10	What is a term-to-term rule?	A rule telling you how to get from one term to the next in a sequence
11	In a sequence, what is meant by a term?	One of the numbers in the sequence
12	What is the first step when trying to find the next term in a sequence?	Identify the pattern.
13	What is a linear sequence?	A number pattern which increases or decreases by the same amount each time.
14	How do you work out the value of a digit in a long number?	Ignore every other digit (make them zeroes)
15	How do you add decimals?	Same method as usual, lining up the decimal points
16	How do you subtract decimals?	Same method as usual, lining up the decimal points

Unit 2 – Integers, Powers and Roots

#	Question	Answer
1	What does the word product mean?	The result of a multiplication.
2	What sign would the product of 2 negative numbers have?	Positive
3	What sign would the product of a positive and a negative number have?	Negative
4	What sign would the answer to a negative number divided by a positive number have?	Negative
5	What is the definition of a square number?	The product of a number and itself
6	List the first 15 square numbers.	1,4,9,16,25,36,49,64,81,100,121,144,169,196,225
7	What is the definition of a factor?	A number which divides another number exactly.
8	What is the definition of a multiple?	A number in another number's times table.
9	What does HCF stand for?	Highest Common Factor
10	What does LCM stand for?	Lowest Common Multiple
11	What is a cube number?	The product of 3 equal numbers.
12	Why do we use BIDMAS?	Order of operations
13	What is the definition of a prime number?	A number with only 2 factors.

Unit 3 – Simplifying and substitution

#	Question	Answer
1	In algebra, what does "collecting like terms" mean?	Adding or subtracting terms with the exact same letters
2	In algebra, what is substitution?	Replacing something in an expression with something else which is equal to it
3	The symbol for which operation is not written in algebra?	Multiplication
4	How is division represented algebraically?	As a fraction
5	How do you write expressions from sentences?	Replace unknown numbers with letters, everything else should be a number or an operation.

Unit 4 – Fractions, decimals and percentages

#	Question	Answer
1	What is a numerator?	Top number in a fraction
2	What is a denominator?	Bottom number in a fraction
3	What operation does a fraction represent?	Division
4	Which operation do we use for the word 'of'?	Multiplication
5	What's the first step when adding or subtracting fractions?	Write the fractions with a common denominator
6	How do you multiply fractions?	Multiply the numerators and multiply the denominators.
7	How do you convert a decimal to a percentage?	Multiply by 100 (%)
8	How do you simplify fractions?	Divide both the numerator and denominator by a common factor.
9	How do you find an equivalent fraction?	Multiply or divide the numerator and denominator by the same number.
10	How do you find a fraction of an amount?	Divide the amount by the denominator and multiply by the numerator.
11	What does percent mean?	Out of 100
12	How do you convert a fraction to a decimal if the denominator is a factor of 100?	Write the equivalent fraction with a denominator of 100 (then divide by 100)
13	How do you convert a decimal to a fraction?	The numerator is the same digits without the decimal point, the denominator is the place value of the last digit.
14	How do you convert a percentage to a decimal?	Divide by 100 (%)

Unit 6 – Area, perimeter and volume

#	Question	Answer
1	State the properties of a square.	4 edges, all equal length, 4 right angles.
2	State the two properties of a trapezium.	Quadrilateral with one pair of parallel edges
3	What is a vertex?	A point where edges meet
4	State the properties of a parallelogram.	Quadrilateral with 2 pairs of parallel edges.
5	What is the formula for calculating the area of a rectangle?	Area = base \times height
6	How do you work out the perimeter of a 2D shape?	Add all the edge lengths
7	What is the formula for calculating the area of a triangle?	$1/2 \times$ base \times height
8	How do you work out the height of a rectangle if you know the area and the base length?	Area \div Base length
9	What is the formula for calculating the area of a trapezium?	Area = $\frac{1}{2} \times (a+b) \times$ height
10	What is the formula for working out the area of a parallelogram?	Area = base \times height
11	What are the properties of a rectangle?	Quadrilateral with 2 pairs of parallel edges and 4 right angles.
12	What is the formula for working out the area of a square?	Area = base ²
13	How do you work out the height of a triangle if you know the area and the base length?	$2 \times$ Area \div Base length

Unit 7 – Sequences, functions and graphs

None.

Knowledge Retrieval Questions – For Year 8

Unit 1 – Calculations and Accuracy

#	Question	Answer
1	How do you find the median when you have an odd number of pieces of data?	Put the numbers in order and select the middle number
2	How do you find the median when you have an even number of pieces of data?	Put the numbers in order and find the mean of the two middle numbers
3	How do you find the range of a set of data?	Largest number - Smallest number
4	How do you divide by a decimal?	Multiply both numbers by 10 repeatedly until you are dividing by a whole number
5	How do you use a calculation to work out the answer to another calculation with the same digits?	Compare each number to the original number, multiply or divide by powers of 10, as appropriate
6	What are decimal places?	Digits to the right of a decimal point
7	How do you round to 2 decimal places?	Look at the 3rd decimal place, if less than 5 - round down, if 5 or more - round up

Unit 2 – Integers, Powers and Roots

#	Question	Answer
1	How do you estimate a square root?	Identify the square numbers either side of it
2	How do you simplify the product of two powers with the same base?	Add the indices together
3	How do you simplify the division of two powers with the same base?	Subtract the second index from the first
4	What is the answer to any number raised to the power zero?	1
5	How do you simplify a power raised to another power?	Multiply the indices together
6	How is a negative index related to the same positive index?	The negative index is the reciprocal of the positive one
7	How do you determine the index when converting large numbers into standard form?	It is the number of digits after the first non-zero digit
8	How do you determine the index when converting small numbers into standard form?	It is the number of digits before the first non-zero digit
9	The first part of a number written in standard form should be between which 2 numbers?	1 and 10 (smaller than 10...)

Unit 3 – Simplifying and substitution

#	Question	Answer
1	When are brackets used in an expression?	When the order of operations is different to BIDMAS order.
2	How do you expand single brackets?	Multiply the term outside the brackets by each of the terms inside.
3	How do you expand double brackets?	Multiply each of the terms in the first bracket by each of the terms in the second bracket.
4	What is the first step in factorising into single brackets?	Find the highest common factor of the terms.

Unit 4 – Fractions, decimals and percentages

#	Question	Answer
1	With a calculator, how do you convert a decimal to a percentage?	Multiply by 100 (%)
2	With a calculator, how do you convert a decimal to a fraction?	Type the decimal in and press =
3	With a calculator, how do you convert a fraction to a percentage?	Multiply by 100 (%) and press S <=> D
4	With a calculator, how do you convert a fraction to a decimal?	Type the fraction in and press =, followed by S <=> D
5	With a calculator, how do you convert a percentage to a decimal?	Type the percentage in and press =, followed by S <=> D
6	With a calculator, how do you convert a percentage to a fraction?	Type the percentage in and press =

Unit 5 – Forming and solving equations

#	Question	Answer
1	How do you solve an equation with an unknown on one side?	Undo each of the parts of the equation, in reverse BIDMAS order.
2	How do you solve an equation with an unknown on both sides?	Simplify, by subtracting the smaller of the two terms containing the unknown, then proceed as normal.
3	What does it mean to "solve an equation"?	Find the value or values of the unknown which make the equation correct.
4	What do you do if you have brackets in your equations?	If you only have one letter, proceed as normal. If you have more than one letter, expand and simplify, then proceed as normal.
5	How do you rearrange an equation so that x is the subject?	Treat it as if you were solving for x, but your answer will be algebraic.
6	What does it mean to "form an equation"?	Write the sentence as an equation, you may need to remember a formula first.

Unit 6 – Area, perimeter and volume

#	Question	Answer
1	What is the formula for calculating the area of a circle?	Area = $\pi \times \text{radius}^2$
2	What is the formula for calculating the circumference of a circle?	Circumference = $\pi \times \text{diameter}$
3	How do you work out the surface area of a shape?	Work out the area of each face and add them together.
4	What is the relationship between radius and diameter?	Diameter = $2 \times \text{radius}$
5	What is the formula for the volume of a prism?	Volume = Cross-sectional Area \times Length
6	How do you work out the surface area of a prism?	Surface Area = Cross-sectional Area $\times 2$ + Cross-sectional Perimeter \times Length
7	What is the difference between a face, an edge, and a vertex?	A face is a flat surface on a 3D shape, an edge is where two faces meet, a vertex is where edges meet.

Unit 7 – Sequences, functions and graphs

#	Question	Answer
1	How do you find the nth term of a linear sequence?	Identify the term-to-term rule, then work out what you have to add/subtract to get to the first term.
2	How do you work out the equation of a horizontal or vertical line?	Identify the number where the line goes through the axis, a. If horizontal: $y = a$. If vertical: $x = a$.
3	How do you find the value of any term using the nth term rule?	Substitute the number of the term into the nth term rule.
4	How do you work out the gradient of a line?	Choose 2 points on the line, then divide the change in y by the change in x.
5	What do the letters m and c represent in $y = mx + c$?	$m = \text{gradient}$, $c = \text{y-intercept}$
6	How do you find the equation of a line given two points on it?	Find the gradient. Substitute the gradient and the (x,y) of one of the points into $y = mx + c$ and solve for c.
7	How do you know, given the equations of two lines, if they are parallel?	They have the same gradient.
8	How do you find the midpoint given two points?	The midpoint will have coordinates halfway between the x and y coordinates of the two given points.

Term 4 - Homework 1

#	Type	Question	Answer
1	Knowledge	Which operation do we use for the word 'of'?	
	Application 1	Write the calculation for 'Two thirds of 60'	
	Application 2	Write the calculation for 'Seven twelfths of 36'	

2	Knowledge	With a calculator, how do you convert a decimal to a percentage?	
	Application 1	Convert 0.3 into a percentage.	
	Application 2	Convert 0.54 into a percentage.	

3	Knowledge	How do you convert a decimal to a percentage?	
	Application 1	Convert 0.92 into a percentage.	
	Application 2	Convert 0.170 into a percentage.	

4	Knowledge	With a calculator, how do you convert a percentage to a decimal?	
	Application 1	Convert 25% into a decimal.	
	Application 2	Convert 73% into a decimal.	

5	Knowledge	With a calculator, how do you convert a percentage to a fraction?	
	Application 1	Convert 26% into a fraction.	
	Application 2	Convert 95% into a fraction.	

#	Type	Question	Answer
6	Knowledge	How do you multiply fractions?	
	Application 1	Calculate $9/180 \times 6/90$	
	Application 2	Calculate $7/70 \times 3/30$	

7	Knowledge	How do you rearrange an equation so that x is the subject?	
	Application 1	Rearrange the formula $f = cq - x$ making x the subject.	
	Application 2	Rearrange the formula $g = x + br$ making x the subject.	

8	Knowledge	What do you do if you have brackets in your equations?	
	Application 1	Solve $3(4d - 9) = -15$	
	Application 2	Solve $2(5d + 9) = 48$	

9	Knowledge	How do you find a fraction of an amount?	
	Application 1	Find $9/11$ of 33	
	Application 2	Find $8/15$ of 90	

10	Knowledge	What does it mean to "solve an equation"?	
	Application 1	Solve $a - 3 = 27$	
	Application 2	Solve $a + 2 = 20$	

#	Type	Question	Answer
11	Knowledge	What does it mean to "form an equation"?	
	Application 1	Apples cost x pence each and bananas cost y pence each. 5 apples and 4 bananas cost a total of 240p. Write this as an equation.	
	Application 2	The angles in a quadrilateral are $3w$, $7w + 7$, $6w - 7$ and $2w + 3$. Write an expression for the sum of these angles.	

12	Knowledge	What operation does a fraction represent?	
	Application 1	What calculation would you do to write 4 tenths as a decimal?	
	Application 2	What calculation would you do to write 4 ninths as a decimal?	

13	Knowledge	How do you convert a percentage to a decimal?	
	Application 1	Write 92% as a decimal.	
	Application 2	Write 170% as a decimal.	

14	Knowledge	What's the first step when adding or subtracting fractions?	
	Application 1	Complete the first step of the calculation $\frac{7}{10} + \frac{5}{5}$	
	Application 2	Complete the first step of the calculation $\frac{3}{30} + \frac{5}{20}$	

15	Knowledge	How do you solve an equation with an unknown on one side?	
	Application 1	Solve $7b + 1 = 15$	
	Application 2	Solve $7b + 1 = 22$	

Workings Space

Term 4 - Homework 2

#	Type	Question	Answer
1	Knowledge	What does it mean to "solve an equation"?	
	Application 1	Solve $a \div 2 = 6$	
	Application 2	Solve $a - 3 = 21$	

2	Knowledge	How do you work out the perimeter of a 2D shape?	
	Application 1	Calculate the perimeter of a rectangle with dimensions 2cm and 2cm.	
	Application 2	Calculate the perimeter of a rectangle with dimensions (6a) cm and (9a) cm.	

3	Knowledge	How do you work out the surface area of a prism?	
	Application 1	Consider a prism with a front face area of 10m^2 and perimeter of 12m and a length of 5m. Calculate its surface area.	
	Application 2	Consider a prism with a front face area of 12cm^2 and perimeter of 18cm and a length of 10cm. Calculate its surface area.	

4	Knowledge	What is the formula for calculating the area of a trapezium?	
	Application	Calculate the area of this trapezium: 2 parallel edges with lengths of 8 cm and 10 cm. Two diagonal lines of length 6 cm and 7 cm and a height of 5 cm.	

5	Knowledge	What is the difference between a face, an edge, and a vertex?	
	Application 1	How many faces, edges and vertices does a square-based pyramid have?	
	Application 2	How many faces, edges and vertices does a square-based pyramid have?	

#	Type	Question	Answer
6	Knowledge	What do you do if you have brackets in your equations?	
	Application 1	Solve $4(5d - 9) = 19d - 34$	
	Application 2	Solve $4(5d + 7) = 19d + 34$	

7	Knowledge	What is a vertex?	
	Application	Sketch a shape and draw an arrow pointing to a vertex.	

8	Knowledge	How do you work out the height of a rectangle if you know the area and the base length?	
	Application 1	Calculate the height of a rectangle with an area of 54cm^2 and a base length of 9cm.	
	Application 2	Calculate the height of a triangle with an area of 12cm^2 and a base length of 4cm.	

9	Knowledge	What is the formula for working out the area of a square?	
	Application 1	Calculate the area of a square with side length 8cm.	
	Application 2	Calculate the area of a square with side length $(7b)$ cm.	

10	Knowledge	What is the formula for calculating the area of a rectangle?	
	Application 1	Calculate the area of a rectangle with dimensions 2cm and 2cm.	
	Application 2	Calculate the area of a rectangle with dimensions 4cm and 3cm.	

#	Type	Question	Answer
11	Knowledge	What is the formula for calculating the area of a triangle?	
	Application 1	Calculate the area of a triangle with dimensions 2cm and 2cm.	
	Application 2	Calculate the area of a triangle with dimensions 4cm and 3cm.	

12	Knowledge	State the two properties of a trapezium.	
	Application	Sketch a trapezium, using the appropriate symbols.	

13	Knowledge	What is the formula for working out the area of a parallelogram?	
	Application 1	Calculate the area of a parallelogram with dimensions 2cm and 2cm.	
	Application 2	Calculate the area of a parallelogram with dimensions 4cm and 3cm.	

14	Knowledge	State the properties of a square.	
	Application	Sketch a square, using the appropriate symbols.	

15	Knowledge	What is the formula for calculating the circumference of a circle?	
	Application 1	What is the circumference of a circle with a diameter of 8cm? Give your answer in terms of π .	
	Application 2	What is the circumference of a circle with a diameter of 4cm? Give your answer in terms of π .	

Workings Space

Term 4 - Homework 3

#	Type	Question	Answer
1	Knowledge	How do you work out the height of a rectangle if you know the area and the base length?	
	Application 1	Calculate the height of a rectangle with an area of 18cm^2 and a base length of 3cm.	
	Application 2	Calculate the height of a triangle with an area of 24cm^2 and a base length of 6cm.	

2	Knowledge	State the two properties of a trapezium.	
	Application	Sketch a trapezium, using the appropriate symbols.	

3	Knowledge	What is the formula for calculating the area of a rectangle?	
	Application 1	Calculate the area of a rectangle with dimensions 10cm and 4cm.	
	Application 2	Calculate the area of a rectangle with dimensions 4cm and 5cm.	

4	Knowledge	How do you work out the surface area of a shape?	
	Application 1	Work out the surface area of a cuboid with dimensions 5cm, 6cm and 2cm	
	Application 2	Work out the surface area of a cuboid with dimensions 4cm, 6cm and 5cm	

5	Knowledge	How do you work out the gradient of a line?	
	Application 1	Two points on a straight line are (2, 1), and (4, 2). What is the gradient of the line?	
	Application 2	Two points on a straight line are (1, 2), and (4, 5). What is the gradient of the line?	

#	Type	Question	Answer
6	Knowledge	What is the relationship between radius and diameter?	
	Application 1	What is the radius of a circle if the diameter is 8m?	
	Application 2	What is the diameter of a circle if the radius is 14cm?	

7	Knowledge	How do you know, given the equations of two lines, if they are parallel?	
	Application 1	Are the following lines parallel? A: $y = 4x + 2$ and B: $y = 4x - 2$	
	Application 2	Are the following lines parallel? A: $y = 3x + 4$ and B: $y = 4x - 4$	

8	Knowledge	How do you find the equation of a line given two points on it?	
	Application 1	Two points on a straight line are (1, 3), and (4, 6). What is the equation of the line?	
	Application 2	Two points on a straight line are (4, 3), and (6, 6). What is the equation of the line?	

9	Knowledge	How do you work out the equation of a horizontal or vertical line?	
	Application 1	What is the equation of a horizontal line going through 1 on the axis?	
	Application 2	What is the equation of a horizontal line going through - 7 on the axis?	

10	Knowledge	State the properties of a square.	
	Application	Sketch a square, using the appropriate symbols.	

#	Type	Question	Answer
11	Knowledge	What do the letters m and c represent in $y = mx + c$?	
	Application 1	What do the numbers mean in the following equation: $y = 2x + 8$?	
	Application 2	What do the numbers mean in the following equation: $y = 4x + 7$?	

12	Knowledge	What is the formula for working out the area of a parallelogram?	
	Application 1	Calculate the area of a parallelogram with dimensions 10cm and 4cm.	
	Application 2	Calculate the area of a parallelogram with dimensions 4cm and 5cm.	

13	Knowledge	What is a vertex?	
	Application	Sketch a shape and draw an arrow pointing to a vertex.	

14	Knowledge	How do you work out the perimeter of a 2D shape?	
	Application 1	Calculate the perimeter of a rectangle with dimensions 10cm and 4cm.	
	Application 2	Calculate the perimeter of a rectangle with dimensions $(6a)$ cm and $(3a)$ cm.	

15	Knowledge	What is the formula for calculating the area of a triangle?	
	Application 1	Calculate the area of a triangle with dimensions 10cm and 4cm.	
	Application 2	Calculate the area of a triangle with dimensions 4cm and 5cm.	

Workings Space