

Year 10 Maths Foundation Knowledge Booklet Term 2

Name:

Class:

Order	Unit	Links	Pre-requisite skills
1	Integers, powers & roots		
2	Lines, angles & shape		
3	Simplifying & substituting	Unit 1	Using powers, listing factors, understanding product / sum.
4	Area and perimeter	Unit 2	Forming expressions for area/perimeter algebraically through use of brackets, correct notation and simplifying expressions.
5	Calculations & Accuracy	Unit 1	Understanding numbers.
6	FDP	Unit 1	Using powers, understanding lowest common multiples.
7	Sequences, functions and graphs	Unit 3/5	Substituting into a function applying BIDMAS to calculate coordinates, factorising for roots of quadratics, understanding powers and all 4 operations with negatives.
8	Ratio & Proportion	Unit 1/7	Decimals/powers as multipliers, calculating/understanding fractions as parts.
9	Transformations	Unit 2/8	Identifying 90/180/270 degrees, plotting mirror lines of basic functions.
10	Pythagoras and Trigonometry	Unit 1/2/3/4/5	Powers/surds, types of triangles, use in area/perimeter problems to find required lengths, rounding answers.
11	Forming and solving	Unit 3/4	Properties of 2d shapes, angle facts including polygons & parallel lines, algebraic notation and simplifying, forming expressions.
12	Measures	Unit 1/7	Calculating, multiplying decimals and powers of 10 for metric conversions.
13	Volume and Surface area	Unit 4/5/13	Area of 2d shapes, rounding/calculating with bounds, conversion of units (length/area/volume), calculating missing sides using pythagoras/ trigonometry.
14	Probability	Unit 1/7	Types of numbers, calculating with fractions & decimals.
15	Inequalities	Unit 12/8/5/7	Solving equations, rounding, plotting graphs for regions, calculating with fractions.
16	Statistics	Unit 1/6/9/16	Using a protractor for pie charts, proportion to calculate angles for a pie chart, use of inequality symbols for recording data.

Homework 1 Due	
Homework 2 Due	
Homework 3 Due	



Year 10 - Term 2: Foundation

<u>Overview</u>	Learning Objective		
Topic: Area and Perimeter Big Questions	- Calculate the area of a triangle, parallelogram,	- Calculate the area and perimeter of compound	- Solve problems involving area and perimeter.
- A square has a perimeter of 20cm. What is the area of this square?		-Calculate the area and circumference of a circle.	
- The area of a circle is		-Calculate the surface ar-	
49π. What is the circumfer- ence of this circle?			
- Can you think of another mathematical name for a circular prism?			
Topic: Calculations and Accuracy Big Questions - Estimate the answer to a question. Is your answer an over/under estimate? - What do you think is a suitable degree of accura- cy to round to? Why? - Why might it ne useful to work out an error interval?	 Understand and apply the correct order of opera- tions (BIDMAS). Use a calculator for com- plex calculations. understand and use the four rues of negative num- bers. Round to a given number of significant figures. Estimate answers to cal- culations. Use place value to calcu- late changes to calcula- tions. 	- Introduction to upper and lower bounds.	- Use inequality notation to specify error intervals due to rounding.
Topic: Fractions, decimals and percentages Big Questions - What happens when you divide by a half? - Can you write 3/16 as the sum of unit fractions? (Egyptian fractions)	 -Adding & subtracting decimals - Introduction to fractions (with shape) - Express on quantity as a fraction of another. - Find equivalent fractions. 	 Multiply and divide dec- imals. Find a fraction of an amount. Express one quantity of another as a percentage. (With Calculator). Find a percentage of an 	 -Calculate with mixed numbers. - Compare fractions, decimals and percentages. -Express one quantity of another as a percentage. (Non-Calculator). - Find percentage
- A sale says 20% off. A top in the sale costs £40. Was the original price of the top £48? Why not?	 Simplify fractions. Calculate percentages of quantities. Convert between improper & mixed fractions. Multiply and divide fractions. 	amount (Non – calc). -Increase/decrease an amount by a given per- cent. (Non-calc) - Compare & order frac- tions. - Add and subtract frac- tions	multipliers. -Find a percentage of an amount using multipliers (Calc) - Increase/decrease a quantity by a given per- centage using multipliers. (Calc) - Calculate simple interest



AREA & PERIMETER KNOWLEDGE ORGANISER

DO NOT FORGET YOUR UNITS!



width base width م base m _ia theight utgn9 əpis thgied height height (a + b) x height length x width width x height base x height base x height (side)²

Knowledge Recall



Date Due

Term 2 HW: 1

Score to beat

Section A:Number	Section B: Algebra Geometry & measures	Section C: Using and applying
1. Which is bigger: 67% or $\frac{2}{3}$?	11. Expand: x(x - 2)	21. Work out the area of a parallelogram of base 10cm and height 7cm.
2. Increase £42 by 10%	12. Solve: 4x – 5 = 9	
10 pens cost £3.50 Find the cost of 3 pens	13. If T(n) = 3n - 5, what is the 3 rd term?	22. Three of the angles of a quadrilateral are 100°. 104° and 44°.
4. Estimate: 57 x 388	14. If $y = 5x - 3$, find the value of y when $x = 0$	What is the size of the 4 th angle?
5. Work out: $\frac{4}{5} - \frac{2}{3}$	Use π on the calculator 15. Calculate the area of a circle with radius of 3.5cm (1dp)	23. If the second second a second a second a volume of 100cm ³
 To decrease an amount by 70%, what single multiplier would you use? 	16. Expand & simplify: 3(x + 1) + 2(x + 5)	Find its density in g/cm ³ ?
7. Decrease £64 by 70%	17. Give the inequality:	24. If the relative frequency of getting a 'blue' on a spinner is 0.1, how many reds would you expect to get in 50 spins?
8. Without a calculator work out: 0.3 x 7	18. Work out the value of: 3x + 2y When x = 2 and y = -5	
Round off 3. 55 to one significant figure	19. Write down the next term in this sequence: 1 5 13 25 41	25. Work out the volume of this cuboid?
10. Use a calculator to work out: 5.6 ³ + 11.2	20. If $y = x^2 + 2x$, find the value of y when $x = 3$	6.5m
Total (A)	Total (B)	Total (C)
Test Total (A+B+C)	R (0-9)	Y (10-19) G (20-25)

DUSTOR

PLAGE VALUE

Remember to kept the place value of each number by insert zeros where Look at the number which represents the place value, look to the right, if this

10, 100 & 1000

1's 1/10 1/100 1/1000

10's

100's

10 000's 1000's

Multiplying By Powers of 10

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applicable.

Rounding to...

CALCULATIONS AND ACCURACY KNOWLEDGE ORGANISER

If the number is 4 or less the number stays the same.

digit is 5 or more the number rounds up by 1.

E.g. Round 17 839 to the nearest 10, 100 & 1000

(iii) Nearest 1000 - 18 000

Decimal places (d.p.)

1/1000

1/100

1/10

1's

10's

100's

1000's

10 000's

Dividing By Powers of 10

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(ii) Nearest 100 – 17 800

(i) Nearest 10 – 17 840

Then look to the right of this digit, this is called the decider, this number now Identify the position of the decimal place to be rounded to, e.g. 2d.p. would

be the 2nd digit after the decimal place.

decides whether the decimal place is rounded up or kept the same.

If the decider is 4 or less then leave the digit as it is. If the decider is 5 or more then round the digit up.

The first significant number is the first digit of a number which isn't zero. The 2^{nd} , 3^{ad} , digits follow immediately after the 1^{st} , regardless of zeros. 0.002309 2.03070

Significant figures (s.f.)1. The first significant r2. The 2nd, 3rd, digits fol



ORDERING



Check $\frac{1}{10}$'s next then $\frac{1}{100}$'s and so on. Check integer (whole number) first.

5 + above the number being rounded increases by 1.

HALFWAY VALUES—THE DECISION

4 + below = the number being rounded stays the same. 3.0122 3.0052 3.0032 3.0049

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-2

Start Temperature.

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When estimating you are not guessing you are making the numbers 'easier' for you to work out the sum.

When rounding numbers the place value of each digit must be the same.

ы.

<u>SIG_FIGS</u>: 1st_2nd_3rd_4th 1st_2nd_3rd_4th (If we're rounding to say, 3 st, then the LAST DIGIT is simply the 3rd sig. fig.)

FED NUMBER RULES + ٠ŀ + 11 + × + × + DIREC⁻ П 11 П

 $\frac{30 \times 40}{3 \times 4} = \frac{1200}{12} = 100.$ **UPPER AND LOWER BOUNDS**

= 160

= 0.5 0.5

0.5

20 ×4

Round to 1s.f

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Estimate 23.43 ×4.3

Estimate 29.91 × 38.3 3.1×3.9

Example 1:

Round to 1s.f.

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Finish Temperature.

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DIFFERENCE IN TEMPERATURE

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Example 2:

2. Then calculate the sum using BIDMAS

To estimate a sum, you need to

Estimating

Round each number to **1s.f**

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Any recorded measurement has almost certainly been rounded. The true value will be somewhere between the lower bound and the upper bound

The lower bound is the smallest number that rounds up to the given number. The upper bound is the largest number that rounds down to the given number •

Students should use 'half a unit above' and 'half a unit below' to find upper and lower bounds For discrete data: - data that can only take certain values within a given range

e.g. a coach is carrying 50 people, to the nearest 10. The lower bound is 45, and the upper bound is 54

For continuous data: - data that can take any value within a given range

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• E.g. The length of a stick of wood is 32 cm, measured to the nearest centimetre. The lower bound is 31.5 cm, and the upper bound is 32.5 cm Due to a mathematical peculiarity the upper bound is 32.5 cm rather than 32.49 cm

The lower and upper bounds are sometimes known as the limits of accuracy and the range between them is the error interval •

E.g. The error interval for the 32 cm stick is as follows; 31.5 cm ≤ length of stick < 32.5 cm

Note the use of the strict inequality (<) for the upper bound

The following table shows the combinations to give minimum and maximum values for all four operations of two numbers, a and b: • *a* and *b* lie within limits $a_{min} \le a < a_{max}$ and $b_{min} \le b < b_{max}$ Knowledge Recall





Date Due

Score to beat

Section A:Number	Section B: Algebra Geometry & measures	Section C: Using and applying
1. Which is bigger: $\frac{5}{8}$ or 0.58?	11. Expand: x(x - 1)	21. Work out the area of a parallelogram of base 10cm and height 7cm.
2. Which is bigger: 15% or $\frac{1}{5}$?	12. Factorise: 8x + 12	
3. Increase £40 by 20%	13. Solve: 2(x – 1) = 4	22. Four of the angles of a pentagon are
4. Decrease £60 by 20%	14. Solve: 2x + 7 = x - 3	90°, 156°, 88° and 28°. What is the size of the 5 th angle?
5. Write 7 : 21 in form 1: n	15. Find the 10th term 1 6 11 16 21	23. Work out the area of a triangle of base 7.5m and height 6cm.
6. 10 pens cost £7.50 Find the cost of 4pens	16. If T(n) = n - 7, what is the 5 th term?	
7. Estimate: 43 x 345	17. If $y=4x + 5$, find the value of y when $x = 0$	24. If the probability of rain is 0.05, what is the probability of NO rain?
8. If 25 x 68 = 1700 What is 25 x 0.68	18. If y=4x + 5, find the value of y when x = -2	•
9. Work out: $\frac{4}{5} + \frac{3}{4}$	$\frac{Use \pi = 3}{19. Calculate the area of a circle with diameter of 5cm}$	25. Work out the volume of a cube of edge 3cm?
10. Work out: $5 \times \frac{5}{6}$	$Use \pi = 3$ 20. Calculate the length of the circumference of a circle with radius of 3cm	
Total (A)	Total (B)	Total (C)
Test Total (A+B+C)	R (0-9) Y	(10-19) G (20-25)

Key terms	13	r 2
Fraction – written in the form $\frac{a}{2}$, means	4 54	
"a divided by b".	The remainder	is 2 out of 4
Numerator - the top number of a fraction,	² /, can be written	as 1/2 or 0.5
represent the number of parts being studied		
Denominator – the bottom number of a	$54 \div 4 = 13$ ¹	a or 13.5
fraction, represents the number of parts to	Vou cale acc nov	the buc ston
make one whole		
Equivalent – worth the same amount as	method of divisio	n to find answers
Simplify – reducing a fraction to the equivalent	as decimals. This	represents the
with the lowest possible numerator and	fraction	(
denominator		
Decimal – a number that is not an integer	Example: What is 7.368 – 1.15 ?	X
Percentage – written as a number out of 100	Line the decimals up: 7.368	>
COMPAPING & OPDERING	- 1 <mark>.</mark> 15) ~
DECIMALS	"Pad" with zeros: 1.452	7
STEP 1: Stack the numbers STEP 2: Add zanos so that	+ 1.3 00	of this circle is shaded.
being compared Line up each number has the same the deamal points. number of deamal digits.	Add: 1.452	
4.8 H.800	+ 1.300	To convert decimals to
Ч.826 Ч.826 ч.ог	2.752	percentages, multiply by 100.
4.006 H.006	Example: Add 1.452 to 1.3	
STEP 3: Compare each place STEP 4: Order the numbers value one by one. If a from least to greatest or	Line the decimals up: 1.452	For example, 0.36 = 36%
trumber is the some, move greatest to least. Here, to the next place. They are ordered from 1 1 1 1	+ 1 <mark>.</mark> 3	0.5 = 50%
H. 8 0 0 4.006.4.080.4.800.4.826	"Pad" with zeros: 1.452	
1.020 Remove the zeros you Previously determined to a contract of the previously determined to the prev	+ 1.3 <mark>00</mark>	Do the inverse (divide) to convert
4.006 4.006 4.008, 4.8, 4.826	Add: 1.452	percentages to decimals
	+ 1.300 2.752	
	(ey terms raction – written in the form $\frac{a}{b}$, means a divided by b". Jumerator - the top number of parts being studied Denominator - the bottom number of parts to nake one whole raction, represents the number of parts to nake one whole quivalent – worth the same amount as quivalent – worth the lowest possible numerator and denominator becimal – a number that is not an integer here a mount as a number out of 100 COMPAPING & OPDERING DOMPAPING & OPDERING COMPAPING & OPDERING COMPAPING & OPDERING COMPAPING & OPDERING SIFP : stack the number of decomption to the properiod of the number properties properties properties prove of the number prove of the same of the number prove of the number pro	Experms 13 Experms 13 raction - written in the form $\frac{\pi}{p}$, means a divided by b". The remainder Immerator - the bottom number of a raction, represent the number of parts being studied by b". The remainder 13 ensertion - written for moment of a raction, represent the number of parts being studied by b". The remainder 13 action, represent the number of parts being studied by b". The remainder 13 14 ensertion, represents the number of parts to a number of a raction to the equivalent worth the same amount as a raction, represent state number out of 100 twith the lowest possible numerator and enominator the lowest possible numerator and the number with denominator the equivalent worth the same amount as a number out of 100 twith the decimals up: 7,368 - 1.15 fraction COMPARING & ORDERING Example: What is 7.368 - 1.15 fraction Ectimals = a number out of 100 tender down agains This fraction Commander of the decimals up: 1,452 to 1.3 tender with zeros: 1,452 to 1.3 tender to the decimals up: 1,452 to 1.3 tender to the deci

Knowledge Recall



Date Due

Score to beat

Section A:Number	Section B: Algebra Geometry & measures	Section C: Using and applying
1. Which is bigger: 0.6 or 0.58?	11. Factorise: 10x + 15	21. Work out the area of a parallelogram
2. Increase £80 by 20%	12. Solve: 2(x – 2) = 6	of base 5m and height 3m.
 10 pens cost £8.00 Find the cost of 9pens 	 If T(n) = 2n - 7, what is the 5th term? 	22. Four of the angles of a pentagon are 120°. 26°. 128° and 43°.
4. Estimate: 771 ÷ 3.6	 14. If y=3x - 5, find the value of y when x = -1 	What is the size of the 5 th angle?
5. Work out: <u>4</u> - <u>1</u>	<u>Use π on the calculator</u> 15. Calculate the area of a circle with diameter of 6cm (1dp)	23. A steel ball has s volume of 1500cm ³ . The density of the ball is 95g/cm ³
To decrease an amount by 18%, what single multiplier would you use?	16. Expand & simplify: 4(x - 3) + 3(x + 2)	Work out the mass of the ball <u>in kg</u>
7. Decrease 380 by 18%	17. Give the inequality	24. If the relative frequency of a train being on time is 0.4, how often could you expect the train to be on time over 20days?
 Without a calculator work out: 0.4 x 0.6 	18. Work out the value of: 5x - 2y When x = 2 and y = -3	
Round off 34162 to one significant figure	19. Write down the next term in this sequence: 2 5 11 20 32	25. Work out the volume of this cube?
10. Use a calculator to work out: (1dp) V(3.6 ² – 1.8 ²)	20. If $y = x^2 + 2x$, find the value of y when $x = 5$	25m ²
Total (A)	Total (B)	Total (C)
Test Total (A+B+C)	R (0-9)	Y (10-19) G (20-25)