

Name:

Class:

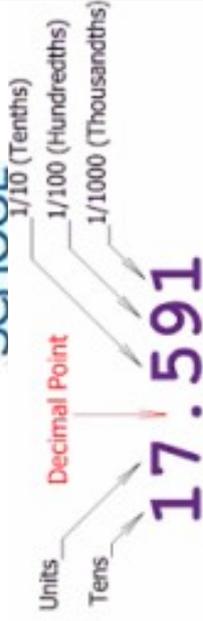
Order	Unit	Links	Pre-requisite skills
1	Integers, powers & roots		
2	Lines, angles & shape		
3	Simplifying & substituting	Unit 1	Using powers, listing factors, understanding product / sum.
4	Area and perimeter	Unit 2	Forming expressions for area/perimeter algebraically through use of brackets, correct 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 1/6	Decimals/powers as multipliers, calculating/understanding fractions as parts.
9	Transformations	Unit 2/7	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 1/6	Calculating, multiplying decimals and powers of 10 for metric conversions.
13	Volume and Surface area	Unit 4/5/12	Area of 2d shapes, rounding/calculating with bounds, conversion of units (length/area/volume), calculating missing sides using pythagoras/ trigonometry.
14	Probability	Unit 1/6	Types of numbers, calculating with fractions & decimals.
15	Inequalities	Unit 11/7/5/6	Solving equations, rounding, plotting graphs for regions, calculating with fractions.
16	Statistics	Unit 1/5/8/15	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 3: Foundation

<u>Overview</u>	<u>Learning Objectives</u>		
<p><u>Topic: Fractions, decimals and percentages</u></p> <p><u>Big Questions</u></p> <ul style="list-style-type: none"> - What happens when you divide by a half? - Can you write $\frac{3}{16}$ as the sum of unit fractions? (Egyptian fractions) - A sale says 20% off. A top in the sale costs £40. Was the original price of the top £48? Why not? 	<ul style="list-style-type: none"> - Adding & subtracting decimals - Introduction to fractions (with shape) - Express on quantity as a fraction of another. - Find equivalent fractions. - Simplify fractions. - Calculate percentages of quantities. - Convert between improper & mixed fractions. - Multiply and divide fractions. 	<ul style="list-style-type: none"> - Multiply and divide decimals. - Find a fraction of an amount. - Express one quantity of another as a percentage. (With Calculator). - Find a percentage of an amount (Non – calc). - Increase/decrease an amount by a given percent. (Non-calc) - Compare & order fractions. - Add and subtract fractions 	<ul style="list-style-type: none"> - Calculate with mixed numbers. - Compare fractions, decimals and percentages. - Express one quantity of another as a percentage. (Non-Calculator). - Find percentage multipliers. - Find a percentage of an amount using multipliers (Calc) - Increase/decrease a quantity by a given percentage using multipliers. (Calc) - Calculate simple interest.
<p><u>Topic: Sequences, functions and graphs</u></p> <p><u>Big Questions</u></p> <ul style="list-style-type: none"> - Convince me that there are no coordinates on the graph of $y=3x^2+4$ which lie below the x-axis - what is the same/ different between: 4, 7, 10, 13 and 13, 10, 7, 4 	<ul style="list-style-type: none"> -Plotting straight line graphs from a table of values. -Recognise & plot horizontal & vertical lines. ($x=1$, $y=3$). -Calculate the gradient of a linear graph. - Generate a sequence given the nth term rule. - Find the nth term rule given a sequence. - Mathematical reasoning with nth term rules. - Draw quadratic graphs from a table of values. 	<ul style="list-style-type: none"> - Recognise and use sequences of quadratic and geometric sequences. - Solve simultaneous equations graphically. - Recognise and use sequences of triangular, square and cube numbers and Fibonacci type sequences. - Calculate the mid-point of a line. -Use $y= mx + c$ to identify the equation of a line. - Use $y = mx + c$ to identify parallel lines. 	<ul style="list-style-type: none"> - Find the equation of a line through two points or one point with a given gradient. - Sketch graphs of cubic and reciprocal functions from a table of values. - Identify the turning point of a quadratic by sketching the graph. - Complete the square of a quadratic to calculate its turning point. -Geometric progression.
<p><u>Topic: Ratio and Proportion</u></p> <p><u>Big Questions</u></p> <ul style="list-style-type: none"> - What is the same / different: - 4:5 and £4:500p - 2:3, 34:51 and 3:2 - The answer is '£350 and £450'. What is the question? 	<ul style="list-style-type: none"> - Solve problems involving recipes. - Introduction to proportion. (clip 42) - Calculate the best value of a product. 	<ul style="list-style-type: none"> - Divide quantities by simple ratios. - Write ratios as a fraction. - Use ratio to convert between currencies. Use ratio to solve problems about exchange rates. -Ratio/fractions/graphs. 	<ul style="list-style-type: none"> -Similar shapes length. - Similar shapes with area & volume.



What Percentage is this?

If a student received $\frac{28}{50}$ what percentage is this?

Change the denominator to 100 by x2

$$\frac{28 \times 2}{50 \times 2} = \frac{56}{100} = 56\%$$

If a student received $\frac{26}{40}$ what percentage was this?

Change the denominator to 100 by $\div 2$ and x5

$$\frac{26 \div 2}{40 \div 2} = \frac{13 \times 5}{20 \times 5} = \frac{65}{100} = 65\%$$

Fractions to Decimals

If the fraction has a denominator which is a power of 10, the decimal can be found. You could find an equivalent fraction to create a denominator of 10, 100, 1000 etc.

$$\frac{3}{10} = .3$$

$$\frac{17}{100} = .17$$

$$\frac{5}{100} = .05$$

$$\frac{323}{1000} = .323$$

$$\frac{47}{1000} = .047$$

$$\frac{9}{1000} = .009$$

FRACTIONS, DECIMALS AND PERCENTAGES KNOWLEDGE ORGANISER

Key terms

Fraction – written in the form $\frac{a}{b}$, means “a divided by b”.

Numerator – the top number of a fraction, represent the number of parts being studied

Denominator – the bottom number of a fraction, represents the number of parts to make one whole

Equivalent – worth the same amount as

Simplify – reducing a fraction to the equivalent with the lowest possible numerator and denominator

Decimal – a number that is not an integer

Integer – a whole number with denominator 1

Percentage – written as a number out of 100

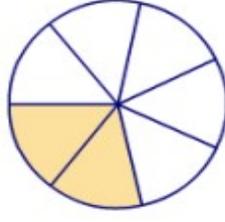
$$\begin{array}{r} 13 \text{ r } 2 \\ 4 \overline{) 54} \end{array}$$

The remainder is 2 out of 4

$\frac{2}{4}$ can be written as $\frac{1}{2}$ or 0.5

$$54 \div 4 = 13 \frac{1}{2} \text{ or } 13.5$$

You can also use the bus stop method of division to find answers as decimals. This represents the fraction



$$\frac{2}{7}$$

of this circle is shaded.

To convert decimals to percentages, multiply by 100.

For example, $0.36 = 36\%$
 $0.5 = 50\%$

Do the inverse (divide) to convert percentages to decimals

Example: What is $7.368 - 1.15$?

Line the decimals up: 7.368

$$- 1.15$$

"Pad" with zeros: 1.452

$$+ 1.300$$

Add: 1.452

$$+ 1.300$$

$$2.752$$

Example: Add 1.452 to 1.3

Line the decimals up: 1.452

$$+ 1.3$$

"Pad" with zeros: 1.452

$$+ 1.300$$

Add: 1.452

$$+ 1.300$$

$$2.752$$

COMPARING & ORDERING DECIMALS

STEP 1: Stack the numbers being compared. Line up the decimal points.

$$\begin{array}{r} 4.8 \\ 4.826 \\ 4.08 \\ 4.006 \end{array}$$

STEP 2: Add zeros so that each number has the same number of decimal digits.

$$\begin{array}{r} 4.800 \\ 4.826 \\ 4.080 \\ 4.006 \end{array}$$

STEP 3: Compare each place value one by one. If a number is the same, move to the next place.

$$\begin{array}{r} 4.800 \\ 4.826 \\ 4.080 \\ 4.006 \end{array}$$

STEP 4: Order the numbers from least to greatest or greatest to least. Here, they are ordered from least to greatest.

$$4.006, 4.080, 4.800, 4.826$$

Remove the zeros you previously added.

$$4.006, 4.08, 4.8, 4.826$$

Date Due _____

Score to beat _____

Section A: Number	Section B: Algebra Geometry & measures	Section C: Using and applying
1. Which is bigger: $\frac{7}{8}$ or 0.78?	11. Expand: $y(y + 10)$	21. Work out the height of a parallelogram of base 10m and area 60m^2 .
2. Which is bigger: 0.125 or 0.15?	12. Factorise: $14x + 21$	22. Five of the angles of a hexagon are 12° , 147° , 76° , 104° and 105° . What is the size of the 6 th angle?
3. Increase £40 by 5%	13. Solve: $2(x + 3) = 8$	23. Work out the area of a triangle of base 12m and height 2.4m.
4. Decrease £900 by 5%	14. Solve: $2x - 2 = x - 5$	24. If the probability of a win is 0.2 and the probability of a draw is 0.1, what is the probability of a loss?
5. Write 12 : 6 in form n : 1	15. Find the 10th term 5 8 11 14 17 ...	25. Work out the volume of a cube where the area of a single face = 49mm^2 ?
6. 10 pens cost £4.20 Find the cost of 3 pens	16. If $T(n) = 6n - 1$, what is the 1 st term?	
7. Estimate: $8552 \div 28$	17. If $y = 4x - 1$, find the value of y when $x = -2$	
8. If $25 \times 68 = 1700$ What is $1700 \div 6.8$	18. If $y = -4x + 1$, find the value of y when $x = 3$	
9. Work out: $\frac{3}{4} - \frac{3}{5}$	19. Calculate the area of a circle with diameter of 10cm <i>Use $\pi = 3$</i>	
10. Work out: $\frac{3}{5}$ of 7 kg	20. Calculate the length of the circumference of a circle with radius of 4cm <i>Use $\pi = 3$</i>	
Total (A)	Total (B)	Total (C)
Test Total (A+B+C)	R (0-9)	Y (10-19) G (20-25)

A sequence is a series of numbers that follow a set pattern. Each number in a sequence is called a term.

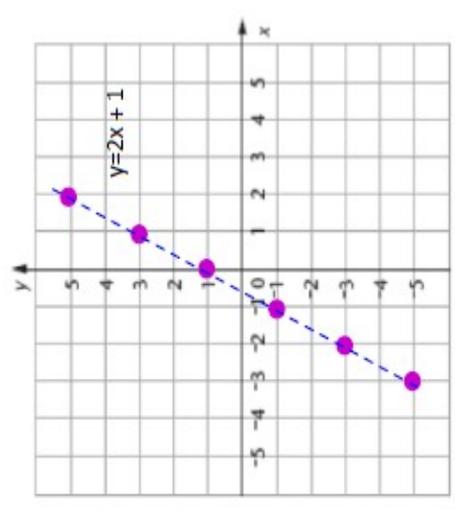
How to Complete a Table and Plot a Straight Line Equation

1 Complete the table by substituting (replacing) the x values from the table into the equation $y = 2x + 1$

This will give you the corresponding y values

X	-3	-2	-1	0	1	2
Y	-5	-3	-1	1	3	5

2 Plot the coordinates
(2; 5) (1; 3) (0; 3) (-1; -1) (-2; -3) (-3; -5)



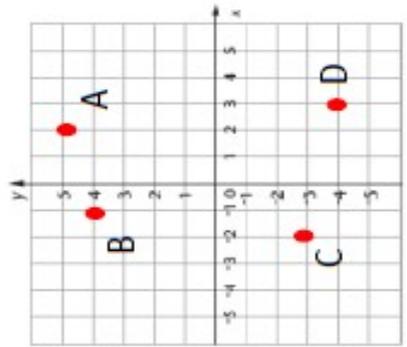
$y = mx + c$



m is the gradient, or the slope of the graph
c is the y-intercept, or where the graph cuts the y-axis

Along the corridor, up/down the stairs (x, y)

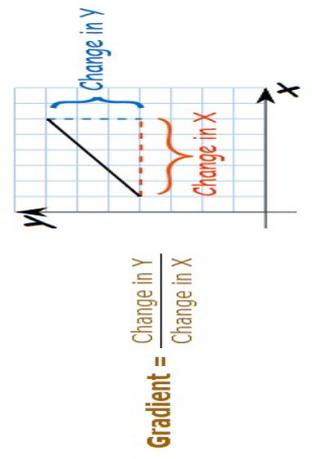
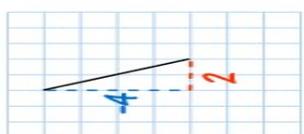
Always write the X first (across), then Y (up)



- A (2 ; 5)
- B (-1 ; 4)
- C (-2 ; -3)
- D (3 ; -4)

Term to term rule tells you the next number in the sequence.

- 1, 3, 5, 7 [add 2]
- 29, 25, 21, 17 [subtract 4]

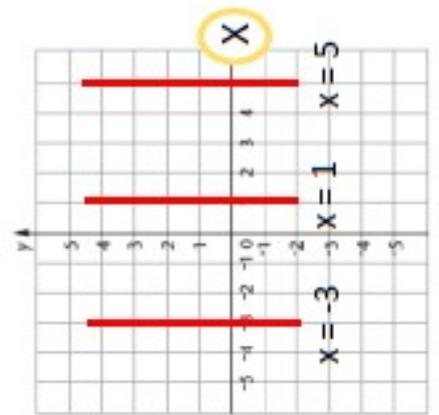
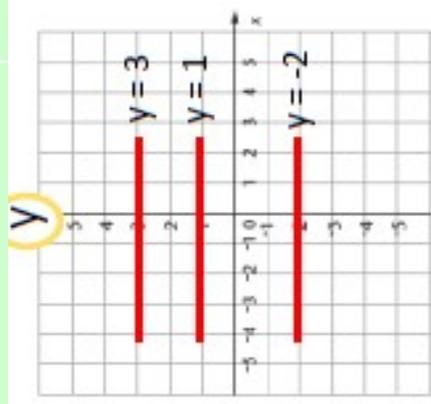


Linear Sequences

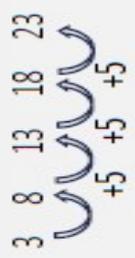
A linear sequence increases or decreases by the same amount from term to term
4, 11, 18, 25... or 12, 8, 4, 0...

Square numbers: 1, 4, 9, 16, 25...
Cube numbers: 1, 8, 27, 125, 216...
*Triangular numbers: 1, 3, 6, 10, 15
**Fibonacci sequence: 0, 1, 1, 2, 3, 5...

Special Sequences



How to find the nth term in a Linear Sequence



1. Find the difference between each term:
5
2. Always put 'n' next to it (n = term number)
 $5n$
3. Add or subtract to get the first term in the sequence?
 $5n - 2 = 3$
The nth term is $5n - 2$

Date Due _____

Score to beat _____

Section A: Number	Section B: Algebra Geometry & measures	Section C: Using and applying
1. Which is bigger: $\frac{7}{8}$ or $\frac{3}{4}$?	11. Expand: $y(2y + 1)$	21. Work out the height of a parallelogram of base 5cm and area 45cm^2 .
2. Which is bigger: 12.5% or $\frac{3}{20}$?	12. Factorise: $3 - 6x$	22. A quadrilateral has sides of 147° and 89° . If the other two angles are equal, what would one of these angles be?
3. Increase 44 by 10%	13. Solve: $3(x - 3) = 0$	23. Work out the height of a triangle with a base 10m and area 20m^2 .
4. Decrease £680 by 10%	14. Solve: $5x + 1 = 3x + 3$	24. If the probability of a win is 0.12 and the probability of a draw is 0.6, what is the probability of a loss?
5. Write 10 : 2 in form n : 1	15. Find the 10th term 4 5 6 7 8 ...	25. Work out the volume of a cuboid of edge 4m by 4cm by 7cm?
6. 5 bags of plaster cover 35m^2 What will 7 bags cover?	16. If $T(n) = 6n + 2$, what is the 3 rd term?	
7. Estimate: $3670 \div 48$	17. If $y = 4x + 3$, find the value of y when $x = -2$	
8. If $264 \times 16 = 4224$ What is $4224 \div 2640$	18. If $y = -4x - 3$, find the value of y when $x = -2$	
9. Work out: $\frac{2}{3} + \frac{3}{4}$	19. Calculate the area of a circle with radius of 2cm <i>Use $\pi = 3$</i>	
10. Work out: $5 \times \frac{3}{4}$	20. Calculate the length of the circumference of a circle with radius of 7cm <i>Use $\pi = 3$</i>	
Total (A)	Total (B)	Total (C)
Test Total (A+B+C)	R (0-9)	Y (10-19)
		G (20-25)

Key Facts - Ratio

Ratios are used to show how things are shared.

For example: The ratio of red smarties to blue smarties. For every 3 RED smarties there are TWO blue smarties

Red: Blue ● ● ● ●
3 : 2

Keywords

Common denominator	Proportion
Fraction	Ratio
Highest common factor	Simplify
Portion	Share

Common Problems and Misconceptions

- Not reading the question correctly and always assuming you divide the total by the total ratio

Key Facts – Sharing an Amount in Part of a Ratio (c)

Sharon and **Bob** share some money in a ratio **2 : 5**
 Bob gets £45 more than Sharon. How much does each person get?

1. Find the difference between the ratios $5 - 2 = 3$
2. Divide: $£45 \div 3 = 15$
3. Multiply: $2 \times 15 = 30$ Sharon's share
4. Multiply: $5 \times 15 = 75$ Bob's share ✓
 Check your answer: $75 - 30 = 45$

Curriculum Flowchart



Key Facts – Sharing an Amount in a Ratio (Sharing the WHOLE)

Monty and Mosaurus get A TOTAL of £72 pocket money.

They share it in the **ratio 5 : 3**

How much do they each get?

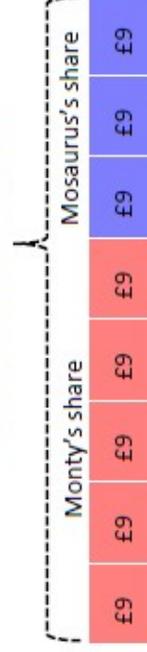
- Add the ratios: $3 + 5 = 8$
- Divide 72 by 8 ($72 \div 8 = 9$)

Each ONE portion is worth £9

Monty has 5 portions
 $5 \times 9 = £45$

Mosaurus has 3 portions
 $3 \times 9 = £27$

£72 split into 8 equal portions



Key Facts – Sharing an Amount in a Ratio (b)

In a school the ratio of boys to girls is **9 : 4**.

There are 270 boys in the school. How many students are there in the school altogether?

Divide the total number of boys by the boy's ratio

$$270 \div 9 = 30$$

This gives the number for 1 'portion'

Girls

$$4 \times 30 = 120$$

Key Facts – Simplifying a Ratio

Ratios can be fully simplified just like fractions.

To simplify a ratio, divide all of the numbers in the ratio by the same number (highest common factor) until they cannot be divided any more.

Simplify: 6 : 12 **Simplify: 6 : 1.5**

Divide both by 6

Multiply both sides by 2

1 : 2

12 : 3

Divide both by 3

4 : 1

Key Facts – Writing in the Ratio 1 : n

When asked to write a ratio in the format **1 : n**, you need to divide **BOTH** sides by **the ratio where the 1 is**.

Write **7 : 21** in the ratio **1 : n**

7 : 21 divide both sides by **7**

1 : 3

Write **16 : 8** in the ratio **1 : n**

16 : 8 divide both sides by **16**

1 : $\frac{1}{2}$

Key Facts – Write a Ratio as a Fraction

Bill and **Mary** share £50 in the ratio **2 : 3**

Write Bill's share as a fraction: $\frac{2}{5}$

Bill's fraction ↗

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 $\frac{2}{3}$?	11. Expand: $y(5 - 3y)$	21. Work out the height of a parallelogram of base 4cm and area 32cm^2 .
2. Which is bigger: 17.5% or $\frac{1}{6}$?	12. Factorise: $9x - 6x^2$	22. What are the three angles in an isosceles, right-angled triangle?
3. Increase 1200 by 2%	13. Solve: $3x - 3 = 2x$	23. Work out the height of a triangle with a base 8m and area 12m^2 .
4. Decrease £1200 by 2%	14. Solve: $3(x + 1) = 3$	24. If the probability of a win is 0.2 and the probability of a draw is 0.64, what is the probability of a loss?
5. Write 8 : 2 in form n : 1	15. Find the 10th term 2 5 8 11 14 ...	25. Work out the surface area of a cube of edge 3m?
6. 6 bags of plaster cover 42m^2 What will 10 bags cover?	16. If $T(n) = 7 - n$, what is the 2 nd term?	
7. Estimate: $285 \div 3.25$	17. If $x + y = 10$, find the value of y when $x = 3$	
8. If $89 \times 25 = 2225$ Work out 8.9×250	18. If $x + y = 10$, find the value of y when $x = -2$	
9. Work out: $\frac{2}{3} \times 2$	19. Calculate the area of a circle with radius of 10cm <i>Use $\pi = 3$</i>	
10. Work out: $8 \div \frac{4}{5}$	20. Calculate the length of the circumference of a circle with diameter of 6.2cm <i>Use $\pi = 3$</i>	
Total (A)	Total (B)	Total (C)
Test Total (A+B+C)	R (0-9)	Y (10-19) G (20-25)