

FOREST HILL GCSE MATHS OVERVIEW OF YEAR 10 SCHEMES OF WORK: NEW SPECIFICATION GRADE 9 TO 1 - SETS 3 TO 5

AUTUMN	05/09/2016 1	12/09/2016 2	19/09/2016 3	26/09/2016 4	03/10/2016 5	10/10/2016 6	17/10/2016 7	24/10/2016 half term	31/10/2016 8	07/11/2016 9	14/11/2016 10	21/11/2016 11	28/11/2016 12	05/12/2016 13	12/12/2016 14	19/12/2016 15	26/12/2016 XMAS
	number	number	algebra/number	algebra	algebra	geometry & measures	geometry & measures		proportion	proportion	statistics & probability	algebra/ statistics & probability					
Set 3 (FOUNDATION)	limits of accuracy; compound interest/ depreciation without a calculator	standard form	raise a number by the power of zero; by a negative power	expanding bracketed expressions; factorising: difference of squares;	simultaneous equations	trigonometry - calculating length	exact trigonometric values "special triangles"		mass, density & volume	force, pressure & area	mean from two different data sets	venn diagrams	REVISION FOR NON-CALC TEST (PAPER 1)	COMPLETION OF NON-CALC TEST (PAPER 1)	work experience	work experience	
Set 4 (FOUNDATION)	percentage of a quantity; fraction of an amount	adding fractions; estimation	division and multiplication; "best buy"; square or cube negative numbers	formula for the nth term; laws of indices	solve equations - two operations; equations of a straight line	transform shapes; describing transformations	conversion between metric units; interpret transportation timetables		ratio;	ratio; distance, speed & time	averages from raw data; median class interval	probability from mutually exclusive events; expected outcome	REVISION FOR NON-CALC TEST (PAPER 1)	COMPLETION OF NON-CALC TEST (PAPER 1)	work experience	work experience	
Set 5 (FOUNDATION)	convert between %, decimal & fractions	rounding; place value smallest/biggest possible number	factors and prime numbers; listing strategies	patterns and sequences	simplify algebraic expressions; solve equations involving one operation	constructing triangles; perimeter; compound area; volume of cuboids	coordinates in four quadrants; calculating line segments involving one axis		simplifying ratio; unit pricing	conversion graphs	frequency polygons; dual bar charts; two-way table	simple probability; probability of event not occurring	REVISION FOR NON-CALC TEST (PAPER 1)	COMPLETION OF NON-CALC TEST (PAPER 1)	work experience	work experience	

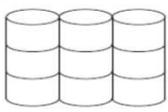
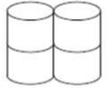
SPRING	02/01/2017 1	09/01/2017 2	16/01/2017 3	23/01/2017 4	30/01/2017 5	06/02/2017 6	13/02/2017 half term	20/02/2017 7	27/02/2017 8	06/03/2017 9	13/03/2017 10	20/03/2017 11	27/03/2017 12	03/04/2017 EASTER	10/04/2017 EASTER
	number	algebra/number	algebra	algebra	geometry & measures		geometry & measures	proportion	statistics & probability	statistics & probability					
Set 3 (FOUNDATION)	FEEDBACK OF NON-CALC PAPER	compound interest/ depreciation; reverse percentages	calculations in standard form	change the subject of a formula; recognise functions	simultaneous equations; inequalities	Pythagoras' theorem		trigonometry: calculating angle/length; bearings	compound measures: mass-density-volume; force-pressure-area; direct & inverse proportion graphs	mean from frequency tables	tree diagrams	REVISION & PAPER 2 CALCULATOR PAPER TEST	financial maths		
Set 4 (FOUNDATION)	FEEDBACK OF NON-CALC PAPER	percentage of a quantity; fraction of an amount; calculations involving mixed numbers; problem-based scenarios	LCM & HCF; reciprocal; roots	solving equations involving two operations; produce expressions/equation s; substitution	laws of indices; formula for the nth term; equations of a straight line	interior/exterior angles; constructing triangles		area and circumference of a circle; compound shapes	distance, speed & time; scale models; exchange rates	averages from raw data; modal class interval; time series & scatter diagrams	probability from mutually exclusive events; expected outcome; stem & leaf diagrams	REVISION & PAPER 2 CALCULATOR PAPER TEST	financial maths		
Set 5 (FOUNDATION)	FEEDBACK OF NON-CALC PAPER	convert between %, decimal & fractions	value of a digit; ordering decimals; factors	simplify algebraic expressions; solve equations involving one operation	patterns and sequences	identifying solids; plans & elevations; angles properties		coordinates axes: midpoint of a line segment	recipe - proportion; simplifying ratio; conversion graphs	pictograms; frequency polygons involving class interval;	simple probability; probability of event not occurring	REVISION & PAPER 2 CALCULATOR PAPER TEST	financial maths		

SUMMER	17/04/2017 1	24/04/2017 2	01/05/2017 3	08/05/2017 4	15/05/2017 5	22/05/2017 6	29/05/2017 half term	05/06/2017 7	12/06/2017 8	19/06/2017 9	26/06/2017 10	03/07/2017 11	10/07/2017 12	17/07/2017 13
	number	algebra	algebra	algebra/ geometry & measures	geometry & measures		proportion	statistics & probability						
Set 3 (FOUNDATION)	FEEDBACK FROM CALC. PAPER	Percentage increase/ decrease	expand bracketed expressions; factorise quadratics expressions; solve quadratic equations; geometric progression	draw quadratic graphs; change the subject of a formula	angles in parallel lines; trigonometry	scale factors of vectors; surface area of a cylinder		compound measures: mass density-volume; force-pressure-area; direct & inverse proportion graphs	venn diagrams; mean from frequency tables	REVISION & PAPER 3 CALCULATOR PAPER TEST	revision for PPE	FEEDBACK FROM CALC. PAPER/ REVISION	END OF YR 10 PPE	END OF YR 10 PPE
Set 4 (FOUNDATION)	FEEDBACK FROM CALC. PAPER	express one quantity as a percentage of another; reciprocal; estimation; mixed numbers; number-based problem-solving	formula for the nth term; solving equations involving two operations; laws of indices	produce expressions/equation s; equations of a straight line	transformations; loci;	similar shapes; area & circumference of a circle; volume of a cylinder		distance, speed & time; exchange rates; ratio	pie charts; scatter diagrams	REVISION & PAPER 3 CALCULATOR PAPER TEST	revision for PPE	FEEDBACK FROM CALC. PAPER/ REVISION	END OF YR 10 PPE	END OF YR 10 PPE
Set 5 (FOUNDATION)	FEEDBACK FROM CALC. PAPER	rounding; place value; BODMAS; conversion between fractions, percentages & decimals; number properties; listing strategies	input-output machines; term-to-term values	simplify algebraic expressions; solve equations involving one operation	interpret scales; measuring time; conversion between metric units	measuring angles; vertices, edges & faces; properties of isosceles triangles; angles in a quadrilateral;		direct proportion; simplifying ratio;	Data collection; sampling; probability scale	REVISION & PAPER 3 CALCULATOR PAPER TEST	revision for PPE	FEEDBACK FROM CALC. PAPER/ REVISION	END OF YR 10 PPE	END OF YR 10 PPE

YEAR 10 SET 3 TO 5 SCHEME OF WORK - NUMBER STRAND - AUTUMN

week	strand	SUPPORT	LEARNING OUTCOME	GRADE										
1	number	convert between %, decimal & fractions	Visualise a fraction diagrammatically Understand a fraction as part of a whole Recognise and write fractions in everyday situations Recall fraction-to-decimal conversions for simple common fractions Write a fraction in its simplest form and recognise equivalent fractions Compare the sizes of fractions using a common denominator Understand that a percentage is a fraction in hundredths Write a percentage as a decimal, or as a fraction in its simplest terms Convert a fraction to a decimal, or a decimal to a fraction Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and $\frac{7}{2}$ or 0.375 or $\frac{3}{8}$) Change recurring decimals into their corresponding fractions and vice versa e.g. 23	1 1 2 2 2 2 1 2 2 2										
		16. Write these numbers in order of size. Start with the smallest number. 0.6 $\frac{2}{3}$ 65% 0.606												
2	number	rounding; place value - smallest/biggest possible number	Understand and order integers Understand and use negative numbers in context, eg thermometers Write figures in words and vice versa Round whole numbers to the nearest, 10, 100, 1000, ... Put digits in the correct place in a decimal number Write decimals in ascending order of size Approximate decimals to a given number of decimal places or significant figures Understand simple instances of BODMAS, eg work out $12 \times 5 - 24 \div 8$	1 1 1 1 1 1 3 2										
		6. There are four cards. There is a number on each card. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 10px;">4</div> <div style="border: 1px solid black; padding: 2px 10px;">5</div> <div style="border: 1px solid black; padding: 2px 10px;">2</div> <div style="border: 1px solid black; padding: 2px 10px;">1</div> </div> (a) Write down the largest 4-digit even number that can be made using each card only once.												
3	number	factors and prime numbers; listing strategies	List all the factors of a given number Understand odd and even numbers, and prime numbers Apply systematic listing strategies including use of the product rule for counting	2 2 3										
		9. Two numbers are added together. The answer is 15. Both the numbers are factors of 24. What are the two numbers? 12. Here is a menu in a cafe. <table border="1" style="margin: 10px auto;"> <thead> <tr> <th colspan="2">Menu</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Starter</td> <td style="text-align: center;">Main Course</td> </tr> <tr> <td style="text-align: center;">Soup</td> <td style="text-align: center;">Chicken</td> </tr> <tr> <td style="text-align: center;">Melon</td> <td style="text-align: center;">Fish</td> </tr> <tr> <td></td> <td style="text-align: center;">Omelette</td> </tr> </tbody> </table> A meal is a starter and a main course. One possible meal is Soup and Chicken. (S, C) Charlie wants to choose a meal. (a) Make a list of all the different meals she can have. One has been done for you. (S, C)	Menu		Starter	Main Course	Soup	Chicken	Melon	Fish		Omelette		
Menu														
Starter	Main Course													
Soup	Chicken													
Melon	Fish													
	Omelette													

FOREST HILL SCHOOL

CORE	LEARNING OUTCOME	GRADE
percentage of a quantity; fraction of an amount	Interpret fractions and percentages as operators Calculate the percentage of a given amount Find a percentage increase/decrease of an amount Multiply and divide a fraction by an integer, by a unit fraction and by a general fraction (expressing the answer in its simplest form)	2 3 4 3
	18. There are 500 passengers on a train. $\frac{7}{20}$ of the passengers are men. 40% of the passengers are women. The rest of the passengers are children. Work out the number of children on the train.	
adding fractions; estimation	Add and subtract fractions by using a common denominator Use fractions in contextualised problems Check their calculations by rounding, eg $29 \times 31 \approx 30 \times 30$ Check answers by reverse calculation, eg if $9 \times 23 = 207$ then $207 \div 9 = 23$ Estimate by rounding numbers to 1 significant figure before performing calculation	3 3 2 2 3
	14. A unit of gas costs 4.2 pence. On average Ria uses 50.1 units of gas a week. She pays for the gas she uses in 13 weeks. (a) Work out an estimate for the amount Ria pays.	
division and multiplication; "best buy"; square or cube negative numbers	Multiply and divide whole numbers by a given multiple of 10 Add, subtract, multiply and divide integers (including formal written methods) Multiply and divide decimal numbers by whole numbers and decimal numbers (up to 2 dp), eg $266.22 \div 0.34$ Know that, eg $13.5 \div 0.5 = 135 \div 5$ Use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2,3,4,5	1 1 2 2 3
	18. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  Pack of 9 toilet rolls £4.23 </div> <div style="text-align: center;">  Pack of 4 toilet rolls £1.96 </div> </div> A pack of 9 toilet rolls costs £4.23 A pack of 4 toilet rolls costs £1.96 Which pack gives the better value for money? You must show all your working.	

EXTENSION	LEARNING OUTCOME	GRADE
limits of accuracy; compound interest/depreciation without a calculator	Find when numbers are given to a specific degree of accuracy, the upper and lower bounds of perimeters (and represented in other context); and interpret limits of accuracy Use inequality notation to specify simple error intervals due to truncation or rounding Calculate simple and compound interest for two, or more, periods of time including in financial mathematics	5 5 5
	24. The height, H cm, of a table is measured as 72 cm correct to the nearest centimetre. Complete the following statement to show the range of possible values of H . $\dots \leq H < \dots$	
	24. Arwen buys a car for £4000. The value of the car depreciates by 10% each year. Work out the value of the car after two years.	
standard form	Understand the standard form convention Convert numbers to, and from, standard form	3 3
	25. Write the following numbers in order of size. Start with the smallest number. 0.038×10^2 3800×10^{-4} 380 0.38×10^{-1}	
raise a number by the power of zero; by a negative power	Use index rules to simplify and calculate numerical expressions involving powers (including negative)	5
	29. (a) Write down the value of 5^0 (b) Write down the value of 2^{-1}	

YEAR 10 SET 3 TO 5 SCHEME OF WORK - ALGEBRA STRAND - AUTUMN

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
4	algebra	patterns and sequences	Generate simple sequences of odd or even numbers	1
			Continue a sequence derived from diagrams	2
			Find the missing numbers in a number pattern or sequence	2

13 Here is a sequence of patterns made with grey square tiles and white square tiles.



pattern number
1



pattern number
2



pattern number
3

(a) In the space below, draw pattern number 4

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
5	algebra	simplify algebraic expressions; solve equations involving one operation	Simplify algebraic expressions in one or more like terms by addition and subtraction	2
			Multiply and divide using algebra and numbers	2
			Use letters or words to state the relationship between different quantities	1
			Understand the difference between the word 'equation', 'formula' and 'expression'	2
			Understand standard mathematical formulae	2
			Solve linear equations involving one operation	2

11. (a) Solve $x + 3 = 12$

(b) Solve $\frac{y}{5} = 10$

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CORE	LEARNING OUTCOME	GRADE
formula for the n th term; laws of indices	Find the n th term of a number sequence as an algebraic expression	3
	Explain why a number is, or is not, a member of a given sequence	3
	Multiply and divide powers of the same variable	3

13 (c) Write an expression, in terms of n , for the number of grey tiles in pattern number n .

22. (b) Simplify $2a^2b \times 3a^3b$

CORE	LEARNING OUTCOME	GRADE
solve equations - two operations; equations of a straight line	Solve linear equations with more than one operation	3
	Find the solution to a problem by writing an equation and solving it	3
	Solve linear equations involving a single pair of brackets	3
	Substitute values of x into linear functions to find corresponding values of y	2
	Plot points for linear functions on a coordinate grid and draw the corresponding straight lines	3
	Interpret m and c as gradient and y -intercept in linear functions (graphically and algebraically)	3
	Understand that the graphs of linear functions are parallel if they have the same value of m	3



22. (a) On the grid, draw the graph of $y = 3x + 5$ for values of x from -2 to 3

(b) Explain why the point $(6, 24)$ does not lie on the line $y = 3x + 5$

EXTENSION	LEARNING OUTCOME	GRADE
expanding bracketed expressions; factorising: difference of squares;	Expand or factorise algebraic expressions involving one pair of brackets	4
	Expand and simplify expressions involving two pairs of brackets	4
	Factorise quadratic expressions (including the difference of two squares)	5

27 Expand and simplify $(x + 3)(x - 1)$

28 Factorise $x^2 - 16$

EXTENSION	LEARNING OUTCOME	GRADE
simultaneous equations	Derive simultaneous equations	4
	Solve algebraically two simultaneous equations	4
	Interpret the solution of two simultaneous equations as the point of intersection of the corresponding lines	4

29 Solve the simultaneous equations

$$4x + y = 25$$

$$x - 3y = 16$$

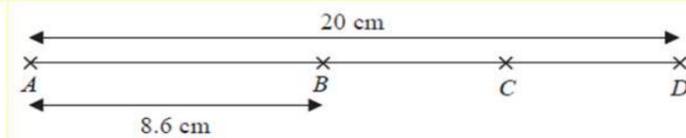
YEAR 10 SET 3 TO 5 SCHEME OF WORK - GEOMETRY STRAND - AUTUMN

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
6	geometry & measures	conversion between metric units; interpret transportation timetables	Make estimates of: length, volume and capacity; weights	1
			Use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate	2
			Make accurate and approximate conversions between metric units	2
			Change freely between related standard units (e.g. time, length, area, volume/capacity, mass) in numerical context	2
			Decide on the appropriate units to use in real-life problems	2
			Read measurements from instruments: scales; analogue and digital clocks; thermometers, etc	2
			Do calculations involving time, including the use of timetables and calendars	2

1. Change 7800 grams into kilograms.

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
7	geometry & measures	coordinates in four quadrants; calculating line segments involving one axis	Plot and read coordinates on a coordinate grid (in all four quadrants)	1
			Understand the difference between a line and a line segment	2
			Understand that one coordinate identifies a point on a line, two coordinates identify a point in a plane and three coordinates identify a point in space, and use the terms '1-D', '2-D' and '3-D'	3
			Find the coordinates of the fourth vertex of a parallelogram	3
			Find areas of shapes by counting squares	1
			Find volumes of shapes by counting cubes	1

14.



A, B, C and D are points on a straight line.

AD = 20 cm

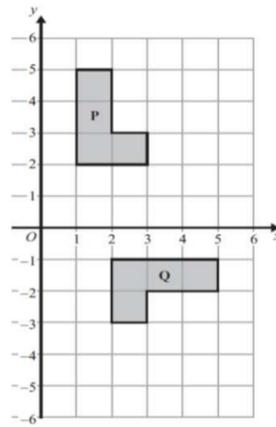
AB = 8.6 cm

BC = CD

Work out the length of BC.

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CORE	LEARNING OUTCOME	GRADE
transform shapes; describing transformations	Understand rotation as a (anticlockwise) turn about a given origin	2
	Identify order of rotational symmetry	2
	Understand translation as a combination of a horizontal and vertical shift including signs for directions; describe translations as 2D vectors	3
	Reflect shapes in a given mirror line; parallel to the coordinate axes and then $y = x$ or $y = -x$	3
	Recognise simple transformations of 2-D shapes	3
	Understand that shapes produced by translation, rotation and reflection are congruent to its image	3
	Distinguish properties that are preserved under transformations, eg write down the angles of a triangle that has been enlarged	3
	Transform triangles and other shapes by translation, rotation and reflection (including combinations of transformations)	3
	Enlarge shapes by a given scale factor from a given point; using positive whole number scale factors, then positive fractional scale factors	4
	Identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection, translation and enlargement (including fractional scale factors)	4
	Describe the changes and invariance achieved by combinations of rotations, reflections and translations	5

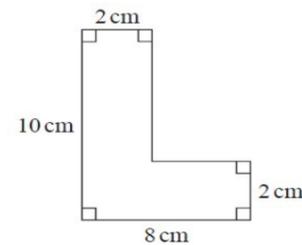


20.

Describe fully the single transformation that maps shape P onto shape Q.

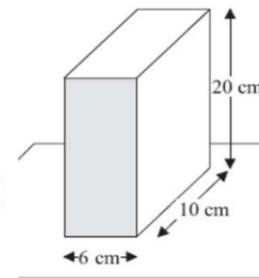
constructing triangles; perimeter; compound area; volume of cuboids	Range of standard constructions including:	GRADE
	The angles 60°, 30° and 45°	2
	Triangles (including equilateral), and other 2-D shapes, given information about their side lengths and angles.	2
	Know the properties of triangles and quadrilaterals to solve problems involving perimeters	2
	Know and apply formulae to calculate: area of triangles, parallelograms, trapezia	3
	Find the perimeter and area of shapes made up from triangles and rectangles	2
	Use formulae for the volume of cuboids and prisms	2
	Solve a range of problems involving areas and volumes	3

16



Work out the area of the shape.

27. Jane has a carton of orange juice. The carton is in the shape of a cuboid.



The depth of the orange juice in the carton is 8 cm.

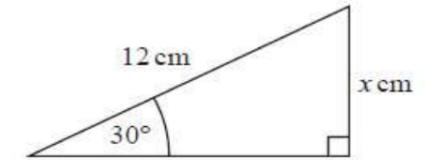
Jane closes the carton. Then she turns the carton over so that it stands on the shaded face.

Work out the depth, in cm, of the orange juice now.

EXTENSION	LEARNING OUTCOME	GRADE
trigonometry - calculating length	Use the trigonometric ratios to calculate unknown lengths in right-angled triangles	5

26

(b)



Given that $\sin 30^\circ = 0.5$, work out the value of x .

exact trigonometric values "special triangles"	Know the exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90° ; know the exact values of $\tan \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and 60° ;	5
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26 (a) Write down the exact value of $\cos 30^\circ$

YEAR 10 SET 3 TO 5 SCHEME OF WORK - PROPORTION STRAND - AUTUMN

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
8	proportion	simplifying ratio; unit pricing	Write a ratio in its simplest form and find an equivalent ratio Solve word problems involving ratios, eg find the cost of 8 pencils given that 6 cost 78p	2 2

7. The total cost of these 2 pens is 60p.



Work out the total cost of 5 of these pens.

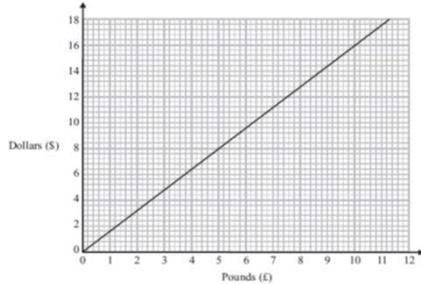
Give your answer in pounds.

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
9	proportion	conversion graphs	Interpret linear graphs, including conversion graphs and distance-time graphs Solve graphically simultaneous equations, eg find when/where the car overtakes the bus	3 3

17.

You can use this conversion graph to change between pounds (£) and dollars (\$).

(a) Use the conversion graph to change £5 to dollars.



Ella has \$200 and £800
Her hotel bill is \$600

Ella pays the bill with the \$200 and some of the pounds.

(b) Use the conversion graph to work out how many pounds she has left.

CORE	LEARNING OUTCOME	GRADE
ratio	Appreciate that, eg the ratio 1:2 represents 1/3 and 2/3 of a quantity i.e. relate ratio to fractions	2
	Divide quantities in a given ratio, eg divide £20 in the ratio 2:3	3
	Relate ratio to linear functions	3
	Understand and use proportion as equality of ratios	3

23. Talil is going to make some concrete mix.
He needs to mix cement, sand and gravel in the ratio 1 : 3 : 5 by weight.

Talil wants to make 180 kg of concrete mix.

Talil has

15 kg of cement

85 kg of sand

100 kg of gravel

Does Talil have enough cement, sand and gravel to make the concrete mix?

ratio; distance, speed & time	Calculate speed when, eg fractions of an hour must be entered as fractions or as decimals Use the relationship between distance, speed and time to solve problems	3 4
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28. The distance from Fulbeck to Ganby is 10 miles.

The distance from Ganby to Horton is 18 miles.



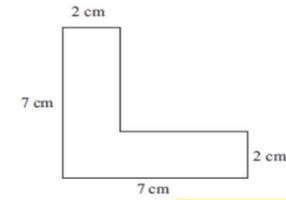
Raksha is going to drive from Fulbeck to Ganby.
Then she will drive from Ganby to Horton.

Raksha leaves Fulbeck at 10:00.
She drives from Fulbeck to Ganby at an average speed of 40mph.

Raksha wants to get to Horton at 10:35.

Work out the average speed Raksha must drive at from Ganby to Horton.

EXTENSION	LEARNING OUTCOME	GRADE
mass, density & volume	Convert between metric units of density, eg kg/m to g/cm	3
	Know that density is found by mass ÷ volume Use the relationship between density, mass and volume to solve problems, eg find the mass of an object with a given volume and density	4 4



21. The diagram shows the cross-section of a solid prism.
The length of the prism is 2 m.

The prism is made from metal.
The density of the metal is 8 grams per cm³.

Work out the mass of the prism.

force, pressure & area	Convert between metric units of speed, eg km/h to m/s Convert between metric units of area, eg cm ² to m ² Know that pressure is found by force ÷ area Use the relationship between pressure, force and area to solve problems, eg find the pressure exerted with a given force and area	3 3 4 4
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21 A box exerts a force of 140 newtons on a table.
The pressure on the table is 35 newtons/m².

Calculate the area of the box that is in contact with the table.

$$p = \frac{F}{A}$$

p = pressure
 F = force
 A = area

YEAR 10 SET 3 TO 5 SCHEME OF WORK - STATISTICS STRAND - AUTUMN

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
3		10	frequency polygons; dual bar charts; two-way table	
			Represent data as:	
			Pictograms	1
			Vertical line graphs	2
			Two-way tables	
			Bar charts, including dual bar charts, and histograms (equal class intervals)	3
			Frequency polygon	
			Frequency diagrams for grouped discrete data	3
			Choose an appropriate way to display discrete, continuous and categorical data	4
			Compare distributions shown in charts and graphs	4
			Understand the difference between a bar chart and a histogram	4

8.

Key:
White bread (white square)
Brown bread (grey square)

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
4		11	simple probability; probability of event not occurring	
			Use the language of probability to describe the likelihood of an event	1
			Represent and compare probabilities on a number scale	2
			List all the outcomes from mutually exclusive events, eg from two coins, and sample space diagrams	2
			Know that if the probability of an event occurring is p then the probability of it not occurring is $1 - p$	2
			Write down the probability associated with equally likely events, eg the probability of drawing an ace from a pack of cards	3

9. James has 9 cards.
Each card has a shape drawn on it.
Each shape is a circle or a square or a triangle.

James takes a card at random.

(i) Which shape is most likely to be on the card?

CORE	LEARNING OUTCOME	GRADE
averages from raw data; median class interval	Apply statistics to describe a population	1
	Find the mode, the median, the mean, and the range for (small) sets of data	1
	Identify the mode from ungrouped frequency distributions and the modal class interval in grouped frequency distributions	2
	Find the class interval containing the median value grouped frequency distributions	3
	Know the advantages/disadvantages of using the different measure of average	4
	Compare distributions using a measure of average and the range	4

25 Four friends each throw a biased coin a number of times.
The table shows the number of heads and the number of tails each friend got.

	Ben	Helen	Paul	Sharif
heads	34	66	80	120
tails	8	12	40	40

The coin is to be thrown one more time.

(a) Which of the four friends' results will give the best estimate for the probability that the coin will land heads?
Justify your answer.

probability from mutually exclusive events; expected outcome	LEARNING OUTCOME	GRADE
	Find the missing probability from a list or table	3
	Find estimates of probabilities by considering relative frequency in experimental results (including two-way tables)	3
	Know that the more an experiment is repeated the better the estimate of probability	3
	Understand that empirical unbiased samples tend towards theoretical probability distributions as the sample size increases	3
	expected no. of times event occurs based on number of trials and probability	3

22 There are only red counters, blue counters, green counters and yellow counters in a bag.
The table shows the probabilities of picking at random a red counter and picking at random a yellow counter.

Colour	red	blue	green	yellow
Probability	0.24			0.32

The probability of picking a blue counter is the same as the probability of picking a green counter.
Complete the table.

EXTENSION	LEARNING OUTCOME	GRADE
mean from two different data sets	Calculate the mean when given the individual mean and sample size of two different data sets	4
	Work out the missing frequency when given the mean of the sample and the mean prior to the event	5

26. There are 18 packets of sweets and 12 boxes of sweets in a carton.
The mean number of sweets in all the 30 packets and boxes is 14.
The mean number of sweets in the 18 packets is 10.
Work out the mean number of sweets in the boxes.

venn diagrams	LEARNING OUTCOME	GRADE
	Interpret sets from venn diagrams	4
	Interpret sets of unions/intersections	4
	Construct venn diagrams when given information about unions/intersections	5

5. Here is a Venn diagram.

(a) Write down all the numbers in set A .

(b) Write down the numbers that are in set $A \cap B$.

YEAR 10 SET 3 TO 5 SCHEME OF WORK - NUMBER STRAND - SPRING

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
2	number	convert between %, decimal & fractions	Visualise a fraction diagrammatically	1
			Understand a fraction as part of a whole	1
			Recognise and write fractions in everyday situations	2
			Recall fraction-to-decimal conversions for simple common fractions	2
			Write a fraction in its simplest form and recognise equivalent fractions	2
			Compare the sizes of fractions using a common denominator	2
			Understand that a percentage is a fraction in hundredths	1
			Write a percentage as a decimal; or as a fraction in its simplest terms	2
			Convert a fraction to a decimal, or a decimal to a fraction	2
			Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and $\frac{7}{2}$ or 0.375 or $\frac{3}{8}$)	2
			Change recurring decimals into their corresponding fractions and vice versa e.g. $2\dot{3}$	2
			<p>8 Here are four fractions.</p> $\frac{1}{2} \quad \frac{17}{24} \quad \frac{3}{4} \quad \frac{5}{12}$ <p>Write these fractions in order of size. Start with the smallest fraction.</p>	
3	number	value of a digit; ordering decimals; factors	Understand and order integers	1
			Understand and use negative numbers in context, eg thermometers	1
			Write figures in words and vice versa	1
			Round whole numbers to the nearest, 10, 100, 1000, ...	1
			Put digits in the correct place in a decimal number	1
			Write decimals in ascending order of size	1
			Approximate decimals to a given number of decimal places or significant figures	3
			Understand simple instances of BODMAS	2
			List all the factors of a given number	2
			Understand odd and even numbers, and prime numbers	2
			<p>7. Michael writes down 4 different factors of 60 He adds the 4 factors together. He gets a number greater than 20 but less than 35</p> <p>What 4 factors could Michael have written down?</p>	

CORE	LEARNING OUTCOME	GRADE
percentage of a quantity; fraction of an amount; calculations involving mixed numbers; problem-based scenarios	Interpret fractions and percentages as operators	2
19 Dave worked out $1\frac{1}{2} \times 5\frac{1}{3}$	Calculate the percentage of a given amount	3
He wrote:	Find a percentage increase/decrease of an amount	4
$1 \times 5 = 5$ and $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$	Multiply and divide a fraction by an integer, by a unit fraction and by a general fraction (expressing the answer in its simplest form)	3
so $1\frac{1}{2} \times 5\frac{1}{3} = 5\frac{1}{6}$	Add, subtract, multiply & divide mixed numbers in a contextualised scenario using a calculator	3
The answer of $5\frac{1}{6}$ is wrong.	Write one number as a percentage of another number	3
(b) Describe one mistake that Dave made.	Write an improper fraction as a mixed number, and vice versa	2
	Add and subtract mixed numbers	4
	Multiply and divide mixed numbers	4
	Justify answers to calculations involving mixed numbers	4
	Add, subtract, multiply, or divide decimal numbers by whole numbers and decimal numbers in a problem-based scenario	3
LCM & HCF; reciprocal; roots	Find the HCF and the LCM of numbers	3
	Write a number as a product of its prime factors, eg $108 = 2 \times 2 \times 3 \times 3 \times 3 = 2^2 \times 3^3$	3
	Find the reciprocal of whole numbers, fractions, and decimals. eg find the reciprocal of 0.4 with and without a calculator	3
	Know that 0 does not have a reciprocal (because division by zero is not defined), and that a number multiplied by its reciprocal is 1	3
	Find the reciprocal of whole numbers, fractions, and decimals	3
	Use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5	3
	<p>22. Ali is planning a party.</p> <p>He wants to buy some cakes and some sausage rolls.</p> <p>The cakes are sold in boxes. There are 12 cakes in each box. Each box of cakes costs £2.50.</p> <p>The sausage rolls are sold in packs. There are 8 sausage rolls in each pack. Each pack of sausage rolls costs £1.20.</p> <p>Ali wants to buy more than 60 cakes and more than 60 sausage rolls. He wants to buy exactly the same number of cakes as sausage rolls.</p> <p>What is the least amount of money Ali will have to pay?</p>	

EXTENSION	LEARNING OUTCOME	GRADE
compound interest/depreciation; reverse percentages	Use a multiplier to increase by a given percent, eg 1.1×64 increases 64 by 10% Calculate simple and compound interest for two, or more, periods of time including in financial mathematics Calculate compound interest over n years Find a reverse percentage, eg find the original cost of an item given the cost after a 10% deduction	3 5 5 4
	<p>12.</p> <p>Ali bought his car for £20 000</p> <p>The car depreciated by 20% the first year. The car depreciated by 10% the second year.</p> <p>(b) Work out the value of the car at the end of the second year.</p>	
calculations in standard form	Add, subtract, multiply and divide numbers in standard form using a calculator	4
	Round numbers given in standard form to a given number of significant figures	4
	Calculate with numbers given in standard form with, and without, a calculator	5

YEAR 10 SET 3 TO 5 SCHEME OF WORK - ALGEBRA STRAND - SPRING

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
4	algebra	simplify algebraic expressions; solve equations involving one operation	Simplify algebraic expressions in one or more like terms by addition and subtraction Multiply and divide using algebra and numbers Use letters or words to state the relationship between different quantities Understand the difference between the word 'equation', 'formula' and 'expression' Understand standard mathematical formulae Solve linear equations involving one operation	2 2 1 2 2 2

3. Simplify $3 \times g \times 5 \times h$

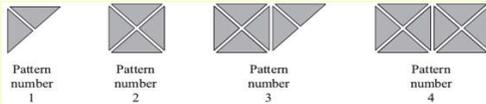
4 (a) Simplify $5f - f + 2f$

(b) Simplify $2 \times m \times n \times 8$

(c) Simplify $t^2 + t^2$

week	strand	patterns and sequences	LEARNING OUTCOME	GRADE
5	algebra	patterns and sequences	Generate simple sequences of odd or even numbers Continue a sequence derived from diagrams Find the missing numbers in a number pattern or sequence	1 2 2

5. Here are some patterns made from triangles.



(a) Complete the table.

Pattern number	1	2	3	4	5
Number of triangles	2	4	6		

(b) How many triangles are needed for Pattern number 12?

FOREST HILLS SCHOOL

CORE	LEARNING OUTCOME	GRADE
solving equations involving two operations; produce expressions/equations; substitution	Solve linear equations with more than one operation Find the solution to a problem by writing an equation and solving it	3 3
	Solve linear equations involving a single pair of brackets Substitute positive and negative numbers into simple algebraic formulae including scientific formulae	3 3

16 (a) Solve $4c + 5 = 11$

(b) Solve $5(e + 7) = 20$

(c) Simplify $(m^3)^2$

laws of indices; formula for the nth term; equations of a straight line	LEARNING OUTCOME	GRADE
	Multiply and divide powers of the same variable Understand and use the index rules to simplify algebraic expressions	3 4
	Find the nth term of a number sequence as an algebraic expression Apply the formula for the nth term of a sequence	3 3
	Explain why a number is, or is not, a member of a given sequence Plot points for linear functions on a coordinate grid and draw the corresponding straight lines Interpret m and c as gradient and y-intercept in linear functions (graphically and algebraically)	3 3 3
	Understand that the graphs of linear functions are parallel if they have the same value of m	3

23.

The n th term of a sequence is $n^2 + 4$

Alex says

"The n th term of the sequence is always a prime number when n is an odd number."

Alex is wrong.

Give an example to show that Alex is wrong.

EXTENSION	LEARNING OUTCOME	GRADE
change the subject of a formula; recognise functions	Change the subject of a formula, eg convert the formula for converting Celsius into Fahrenheit into a formula that converts Fahrenheit into Celsius Plot and recognise cubic and reciprocal functions	4 5

20 Make t the subject of the formula $w = 3t + 11$

simultaneous equations; inequalities	LEARNING OUTCOME	GRADE
	Derive simultaneous equations Solve algebraically two simultaneous equations Interpret the solution of two simultaneous equations as the point of intersection of the corresponding lines Rearrange and solve linear inequalities in one variable and show the solution set on a number line, or to write down all the integer solutions	4 4 4 4

QUESTION FOUND IN PAPER 3:

19. Abbie is 5 years older than Cathy.
Bhavna is twice as old as Abbie.
The total of their ages is less than 30

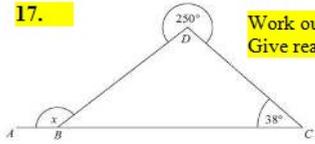
What is Bhavna's greatest possible age?

Give your answer as a whole number of years.
You must show all your working.

YEAR 10 SET 3 TO 5 SCHEME OF WORK - GEOMETRY STRAND - SPRING

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
6	geometry & measures	identifying solids; plans & elevations; angles properties	Identify properties of the vertices, faces and edges of the 3-D shapes: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres. Draw nets of solids and recognise solids from their nets. Recognise and name examples of solids, including prisms, in the real world. Draw and interpret plans and elevations. Draw planes of symmetry in 3-D shapes. Mark parallel lines in a diagram. Use angle properties on a line and at a point to calculate unknown angles. Use angle properties of triangles and quadrilaterals to calculate unknown angles. Recall and use angle properties of equilateral, isosceles and right-angled triangles. Recall and use the properties of squares, rectangles, parallelograms, trapeziums, rhombuses and kites. Find the three missing angles in a parallelogram when one of them is given.	1 1 3 4 1 2 2 2 2 3

17.

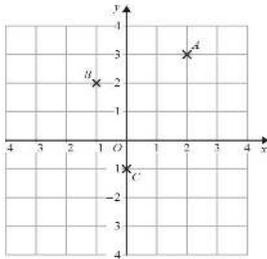


Work out the size of the angle marked x .
Give reasons for your answer.

7	geometry & measures	coordinates axes: midpoint of a line segment	Writing down the coordinates of the midpoint of the line connecting two points	3
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14

(a) Write down the coordinates of point C .



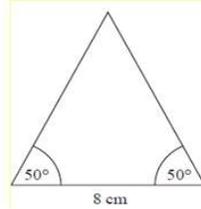
$ABCD$ is a square.

(b) On the grid, mark with a cross (X) the point D so that $ABCD$ is a square.

(c) Write down the coordinates of the midpoint of the line segment BC .

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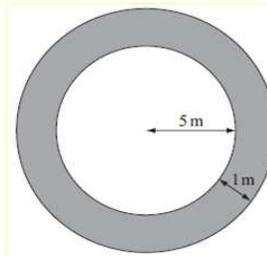
CORE	LEARNING OUTCOME	GRADE
interior/exterior angles; constructing triangles	Calculate interior and exterior angles in a polygon. Calculate and use the sums of the interior angles of convex polygons of sides 3, 4, 5, 6, 8 and 10. Know, or work out, the relationship between the number of sides of a polygon and the sum of its interior angles. Know that the sum of the exterior angles of any polygon is 360° . Find the size of each exterior/interior angle of a regular polygon.	3 3 3 3
	Construct triangles (including equilateral), and other 2-D shapes, given information about their side lengths and angles. Understand, by their experience of constructing them, that triangles satisfying SSS, SAS, ASA and RHS are unique, but SSA triangles are not.	2 3



7. Here is a sketch of the end of a roof of a toy house.
Draw an accurate diagram of the end of the roof.

area and circumference of a circle; compound shapes	Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment. Use and recall formulae to calculate circumference and areas of circles. Calculate arc lengths, angles, and areas of sectors of circles. Find the perimeter and area of shapes made up from triangles, rectangles and parts of circles.	3 3 4 4
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24. The diagram shows a circular pond with a path around it.

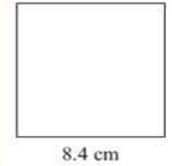


The pond has a radius of 5m.
The path has a width of 1m.

Work out the area of the path.
Give your answer correct to 3 significant figures.

EXTENSION	LEARNING OUTCOME	GRADE
Pythagoras' theorem	Calculate missing length of a right-angled triangle when two sides are known. Calculate the length of the line segment joining two points in the plane (all four quadrants) using Pythagoras' Theorem.	4 4

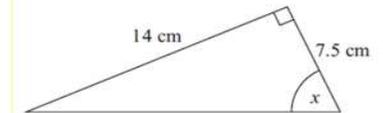
23. A square has sides of length 8.4 cm.



Work out the length of a diagonal of the square.
Give your answer correct to 3 significant figures.

trigonometry: calculating angle/length; bearings	Use trigonometric ratios (sin, cos and tan) to calculate angles in right-angled triangles. Use the trigonometric ratios to calculate unknown lengths in right-angled triangles. Understand and use bearings.	5 5 3
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25. Here is a right-angled triangle.



Work out the size of the angle marked x .
Give your answer to the nearest degree.

YEAR 10 SET 3 TO 5 SCHEME OF WORK - PROPORTION STRAND - SPRING

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
summer	8	recipe - proportion; simplifying ratio; conversion graphs	Solve recipe-based problems Write a ratio in its simplest form and find an equivalent ratio Interpret linear graphs, including conversion graphs and distance-time graphs	2 2 3

18 Here is a list of ingredients for making 16 mince pies.

Ingredients for 16 mince pies

- 240 g of butter
- 350 g of flour
- 100 g of sugar
- 280 g of mincemeat

Elaine wants to make 72 mince pies.

How much of each ingredient will Elaine need?

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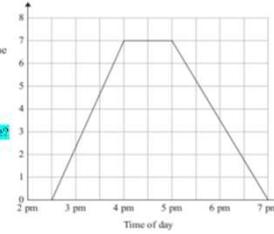
CORE	LEARNING OUTCOME	GRADE
distance, speed & time; scale models; exchange rates	Calculate speed when, eg fractions of an hour must be entered as fractions or as decimals	3
	Use the relationship between distance, speed and time to solve problems	4
	Interpret and construct scale drawing, eg work out the real distance if the map distance is 6 cm scale 1:25000	2
	Use exchange rates to convert between different units of currency	3
	Solve problems involving inverse proportion	4

15. Suha walked 7 km from her home.

She then had a rest.
Suha then walked home.

Distance from home (km)

Here is Suha's travel graph.



(a) What time did Suha leave home?

(b) How long did Suha rest for?

(c) What time did Suha start to walk home?

(d) Work out the total time that Suha was away from home.

EXTENSION	LEARNING OUTCOME	GRADE
compound measures: mass-density-volume; force-pressure-area; direct & inverse proportion graphs	Convert between metric units of area, eg cm ² to m ²	3
	Convert between metric units of speed, eg km/h to m/s	3
	Convert between metric units of density, eg kg/m ³ to g/cm ³	3
	Use the relationship between pressure, force and area to solve problems, eg find the pressure exerted with a given force and area	4
	Use the relationship between density, mass and volume to solve problems, eg find the mass of an object with a given volume and density	4
	Identify direct & inverse proportion graphs	5
	Interpret equations that describe direct and inverse proportion	5

$$p = \frac{F}{A}$$

p = pressure
 F = force
 A = area

26. A box is on a table.

The area of the box in contact with the table is 1500 cm².
The pressure on the table is 28 newtons.m⁻².

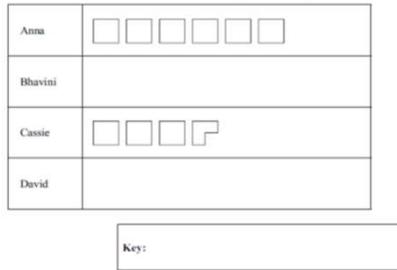
Work out the force exerted by the box on the table.
Give your answer correct to the nearest whole number.

YEAR 10 SET 3 TO 5 SCHEME OF WORK - STATISTICS STRAND - SPRING

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
9	statistics	pictograms; frequency polygons involving class interval;	Interpret pictograms Produce frequency polygons from frequency tables with class intervals	1 3

6.

The pictogram shows the numbers of text messages sent by Anna and Cassie.



(ii) Complete the pictogram and the key.

10	probability	simple probability; probability of event not occurring	Use the language of probability to describe the likelihood of an event	1
			Represent and compare probabilities on a number scale	2
			List all the outcomes from mutually exclusive events, eg from two coins, and sample space diagrams	2
			Know that if the probability of an event occurring is p then the probability of it not occurring is $1 - p$	2
			Write down the probability associated with equally likely events, eg the probability of drawing an ace from a pack of cards	3

11. Barbara has a tube of sweets.

There are 5 sweets in the tube.

There is one sweet of each of these colours in the tube.

red blue green yellow pink

Barbara takes two sweets at random from the tube.

(a) Write down all the possible combinations of colours she can take.

.....

 (2)

(b) What is the probability that Barbara takes a red sweet and a yellow sweet from the tube?

.....
 (1)
 (Total 3 marks)

FOREST HILL SCHOOL

CORE	LEARNING OUTCOME	GRADE
averages from raw data; modal class interval; time series & scatter diagrams	Find the mode, the median, the mean, and the range for (small) sets of data	1
	Identify the mode from ungrouped frequency distributions and the modal class interval in grouped frequency distributions	2
	Know the advantages/disadvantages of using the different measure of average	4
	Compare distributions using a measure of average and the range	4
	Represent data as a time series	3
	Identify trends in data over time	3
	Distinguish between positive, negative and zero correlation using a line of best fit	4
	Use a line of best fit to interpolate	4

10 The manager of a clothes shop recorded the size of each dress sold one morning.

10 10
 12 12
 14 14 14 14 14
 16 16 16 16
 18 18 18
 20 20 20

The sizes of dresses are always even numbers.
 The mean size of the dresses sold that morning is 15.3

The manager says,

"The mean size of the dresses is **not** a very useful average."

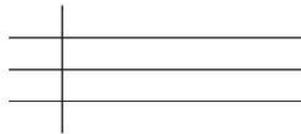
(i) Explain why the manager is right.

probability from mutually exclusive events; expected outcome; stem & leaf diagrams	Find the missing probability from a list or table Find estimates of probabilities by considering relative frequency in experimental results (including two-way tables) Know that the more an experiment is repeated the better the estimate of probability Understand that empirical unbiased samples tend towards theoretical probability distributions as the sample size increases expected no. of times event occurs based on number of trials and probability Stem & leaf diagrams	3 3 3 3 3 4
------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------

13 Here are the heights, in centimetres, of 15 children.

123 147 135 150 147
 129 148 149 125 137
 133 138 133 130 151

(a) Show this information in a stem and leaf diagram.



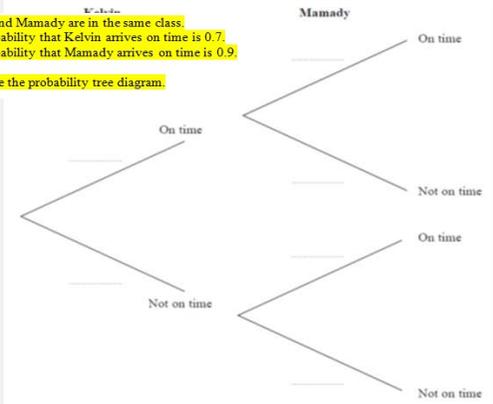
One of the children is chosen at random.

(b) What is the probability that this child has a height greater than 140 cm?

EXTENSION	LEARNING OUTCOME	GRADE
mean from frequency tables	Calculate the mean of data given in an ungrouped frequency distribution Understand and use the sigma notation for the mean of ungrouped, and grouped, data Use the mid interval value to find an estimate for the mean of data given in a grouped frequency distribution	3 3 4

tree diagrams	Know that the probability of A or B is $P(A) + P(B)$ Know that the probability of A and B is $P(A) \times P(B)$ Draw and use tree diagrams to solve probability problems (including examples of non-replacement)	5 5 5
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27. Kelvin and Mamady are in the same class.
 The probability that Kelvin arrives on time is 0.7.
 The probability that Mamady arrives on time is 0.9.
 Complete the probability tree diagram.



(b) Work out the probability that Kelvin and Mamady both arrive on time.

YEAR 10 SET 3 TO 5 SCHEME OF WORK - NUMBER STRAND - SUMMER

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
2	number	rounding; place value; BODMAS; conversion between fractions, percentages & decimals; number properties; listing strategies	Round whole numbers to the nearest, 10, 100, 1000, ... Write the value of a digit based on its place value Understand simple instances of BIDMAS expressed in fractional form List all the factors of a given number Understand odd and even numbers, and prime numbers Understand that a percentage is a fraction in hundredths Write a percentage as a decimal, or as a fraction in its simplest terms Convert a fraction to a decimal, or a decimal to a fraction Apply systematic listing strategies including use of the product rule for counting	1 1 2 2 2 1 2 2 3

12. An internet bookshop uses this advert.

Each day every 3rd customer gets a mystery prize.
Each day every 20th customer gets free postage and packaging.

On Tuesday the internet bookshop had 150 customers.

- (a) How many of the 150 customers got a mystery prize?
- (b) How many of the 150 customers got free postage and packaging?
- (c) How many of the 150 customers got both a mystery prize and free postage and packaging?

FOREST HILL SCHOOL

CORE	LEARNING OUTCOME	GRADE
express one quantity as a percentage of another; reciprocal; estimation; mixed numbers; number-based problem-solving	Calculate the percentage of a given amount Find a percentage increase/decrease of an amount Write one number as a percentage of another number Find the reciprocal of whole numbers, fractions, and decimals, eg find the reciprocal of 0.4 with and without a calculator Know that 0 does not have a reciprocal (because division by zero is not defined), and that a number multiplied by its reciprocal is 1 Estimate by rounding numbers to 1 significant figure before performing calculation Multiply and divide a fraction by an integer, by a unit fraction and by a general fraction (expressing the answer in its simplest form) Write an improper fraction as a mixed number, and vice versa Add and subtract mixed numbers Multiply and divide mixed numbers Justify answers to calculations involving mixed numbers Add, subtract, multiply, or divide decimal numbers by whole numbers and decimal numbers in a problem-based scenario	3 4 4 3 3 3 3 3 2 4 4 4 3
	Use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2,3,4,9	3

3 Work out the reciprocal of 0.125

19 Boxes of chocolates cost £3.69 each.
A shop has an offer:

Boxes of chocolates
3 for the price of 2

Ali has £50
He is going to get as many boxes of chocolates as possible.
How many boxes of chocolates can Ali get?

EXTENSION	LEARNING OUTCOME	GRADE
Percentage increase/decrease	Calculate the percentage increase/decrease of an amount	4

24.

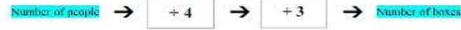
The hospital has a target to reduce the average time patients wait to be treated in the Accident and Emergency department to 60 minutes in 2016.

(b) Work out the percentage decrease from 68 minutes to 60 minutes.

YEAR 10 SET 3 TO 5 SCHEME OF WORK - ALGEBRA STRAND - SUMMER

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
summer	3	input-output machines; terms-to-term values	Use function machines to work out output values Find the next term in the sequence based on the previous term	2

8. John works out the number of boxes of orange juice he will need for a party. He uses this number machine:



10 Complete this table of values.

n	$3n + 2$
12	
	47

summer	4	simplify algebraic expressions; solve equations involving one operation	Simplify algebraic expressions in one or more like terms by addition and subtraction Multiply and divide using algebra and numbers Use letters or words to state the relationship between different quantities Understand the difference between the word 'equation', 'formula' and 'expression' Understand standard mathematical formulae Solve linear equations involving one operation	2 2 1 2 2 2
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7 (a) Solve $f + 2f + f = 20$

(b) Solve $18 - m = 6$

FOREST HILL SCHOOL

CORE	LEARNING OUTCOME	GRADE
formula for the n th term; solving equations involving two operations; laws of indices	Recognise and use sequences of triangular, square and cube numbers Simple arithmetic progressions; Fibonacci type sequences; quadratic sequences Find the n th term of a number sequence as an algebraic expression Explain why a number is, or is not, a member of a given sequence Solve linear equations with more than one operation Multiply and divide powers of the same variable Understand and use the index rules to simplify algebraic expressions	3 3 3 3 3 4

23. Here are the first four terms of an arithmetic sequence.

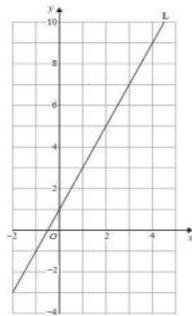
3 10 17 24

(a) Find, in terms of n , an expression for the n th term of this arithmetic sequence.

(b) Is 150 a term of this sequence?

You must explain how you get your answer.

2.3 Line L is drawn on the grid below.



produce expressions/equations; equations of a straight line	Find the solution to a problem by writing an equation and solving it Solve linear equations involving a single pair of brackets Plot points for linear functions on a coordinate grid and draw the corresponding straight lines Interpret m and c as gradient and y -intercept in linear functions (graphically and algebraically) Understand that the graphs of linear functions are parallel if they have the same value of m	3 3 3 3 3
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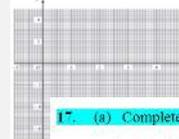
Find an equation for the straight line L.
Give your answer in the form $y = mx + c$

EXTENSION	LEARNING OUTCOME	GRADE
expand bracketed expressions; factorise quadratic expressions; solve quadratic equations; geometric progression	Factorise algebraic expressions involving one pair of brackets Expand and simplify expressions involving two pairs of brackets Factorise quadratic expressions (including the difference of two squares) Deduce roots algebraically of quadratic functions Show the difference between an equation and an identity Recognise and use simple geometric progressions ("where n is an integer, and r is a rational number $\neq 0$)	4 4 5 5 4 5

26 Factorise $x^2 + 3x - 4$

26. Solve $x^2 + 3x - 10 = 0$

draw quadratic graphs; change the subject of a formula



17. (a) Complete the table of values for $y = x^2 - 4x - 2$

x	-1	0	1	2	3	4	5
y		-2	-5			-2	5

(b) On the grid, draw the graph of $y = x^2 - 4x - 2$

(c) Use your graph to estimate the values of x when $y = -3$

REMAINING ALGEBRAIC TOPIC:

Find the equation of the line through two given points, or through one point with a given gradient

5

YEAR 10 SET 3 TO 5 SCHEME OF WORK - GEOMETRY STRAND - SUMMER

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
5	geometry & measures	interpret scales; measuring time; conversion between metric units	Make estimates of: length; volume and capacity; weights Use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate Make accurate and approximate conversions between metric units Change freely between related standard units (e.g. time, length, area, volume/capacity, mass) in numerical context Decide on the appropriate units to use in real-life problems Read measurements from instruments: scales; analogue and digital clocks; thermometers, etc. Do calculations involving time, including the use of timetables and calendars	1 2 2 2 2 2

6. A television programme started at 17:55.
The programme was 1 hour 20 minutes long.

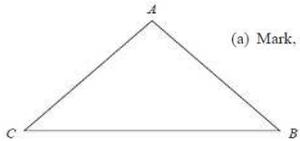
(i) At what time did the programme end?

Mumtaz started to watch this programme at 18:34.

(ii) How many minutes of the programme did Mumtaz miss?

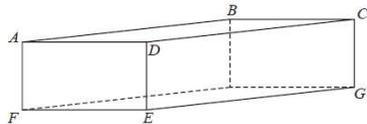
week	strand	SUPPORT	LEARNING OUTCOME	GRADE
6	geometry & measures	measuring angles; vertices, edges & faces; properties of isosceles triangles; angles in a quadrilateral;	Estimate the size of an angle in degrees Measure and draw angle to the nearest degree Distinguish between acute, obtuse, reflex and right angles Identify properties of the vertices, faces and edges of the 3-D shapes: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres Use angle properties of triangles and quadrilaterals to calculate unknown angles Recall and use angle properties of equilateral, isosceles and right-angled triangles Recall and use the properties of squares, rectangles, parallelograms, trapeziums, rhombuses and kites	1 1 1 1 2 2 2

14 Here is a triangle ABC.



(a) Mark, with the letter y , the angle CBA.

Here is a cuboid.



Some of the vertices are labelled.

(b) Shade in the face CDEG.

FOREST HILL SCHOOL

CORE	LEARNING OUTCOME	GRADE
transformations; loci;	Reflect shapes in a given mirror line; parallel to the coordinate axes and then $y = x$ or $y = -x$ Recognise simple transformations of 2-D shapes Enlarge shapes by a given scale factor from a given point; using positive whole number scale factors, then positive fractional scale factors	3 3 4
16. The diagram shows a map of a field. The scale of the map is 1 cm represents 20 m.	Range of standard constructions including: The midpoint and perpendicular bisector of a line segment The perpendicular from a point on a line The bisector of an angle A path equidistant from two points or two line segments A region bounded by a circle and an intersecting line Know that the perpendicular distance from a point to a line is the shortest distance to the line	3 5



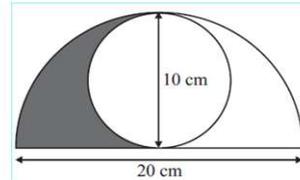
A and B are two wind turbines in the field.
A third wind turbine is to be put in this field.

There must be at least 100 m between wind turbines.

Show, by shading, where the third wind turbine can be put.

similar shapes; area & circumference of a circle; volume of a cylinder	Know the relationship between linear, area and volume scale factors of similar shapes side in each of two similar shapes, given the lengths of a pair of corresponding sides Convert between units of volume Solve problems involving the volume of a cylinder	3 4 3 4
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19. The diagram shows a circle inside a semicircle.

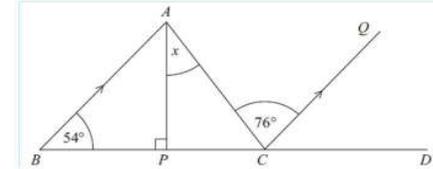


The circle has a diameter of 10 cm.
The semicircle has a diameter of 20 cm.

Work out the area shaded.
Give your answer correct to 1 decimal place.

EXTENSION	LEARNING OUTCOME	GRADE
angles in parallel lines; trigonometry - calculating length/angle	Use parallel lines to identify alternate and corresponding angles Find missing angles using properties of corresponding angles and alternate angles, giving reasons Use trigonometric ratios (sin, cos and tan) to calculate angles in right-angled triangles Use the trigonometric ratios to calculate unknown lengths in right-angled triangles	3 4 5 5

16.



BPCD is a straight line.
BA is parallel to CQ.
AP is perpendicular to BC.

Angle ABC = 54°
Angle ACQ = 76°

scale factors of vectors; surface area of a cylinder	Understand that $2\mathbf{a}$ is parallel to \mathbf{a} and twice its length Understand that $-\mathbf{a}$ is parallel to \mathbf{a} and in the opposite direction Use and interpret vectors as displacements in the plane (with an associated direction) Represent vectors, and combinations of vectors, in the plane Calculate the surface area of cylinders Solve a range of problems involving surface area and volume, eg given the volume and length of a cylinder find the radius	5 5 5 5 5 5
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YEAR 10 SET 3 TO 5 SCHEME OF WORK - PROPORTION STRAND - SUMMER

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
7	proportion	direct proportion; simplifying ratio;	Solve problems involving direct proportion e.g. find the cost of 8 pencils given that 6 cost 78p Write a ratio in its simplest form and find an equivalent ratio	2 2

15 There are 5 grams of fibre in every 100 grams of bread.

A loaf of bread has a weight of 400 g.
There are 10 slices of bread in a loaf.

Each slice of bread has the same weight.

Work out the weight of fibre in one slice of bread.

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CORE	LEARNING OUTCOME	GRADE
distance, speed & time; exchange rates; ratio	Calculate speed when, eg fractions of an hour must be entered as fractions or as decimals	3
	Use the relationship between distance, speed and time to solve problems	4
	Use exchange rates to convert between different units of currency	3
	Divide quantities in a given ratio, eg divide £20 in the ratio 2:3	3
	Solve problems involving inverse proportion	4

11. In August 2008, Eddie hired a car in Italy.

The cost of hiring the car was £620

The exchange rate was £1 = €1.25

(a) Work out the cost of hiring the car in euros (€).

EXTENSION	LEARNING OUTCOME	GRADE
compound measures: mass-density-volume; force-pressure-area; direct & inverse proportion graphs	Convert between metric units of area, eg cm ² to m ²	3
	Convert between metric units of speed, eg km/h to m/s	3
	Convert between metric units of density, eg kg/m to g/cm	3
	Use the relationship between pressure, force and area to solve problems, eg find the pressure exerted with a given force and area	4
	Use the relationship between density, mass and volume to solve problems, eg find the mass of an object with a given volume and density	4
Identify direct & inverse proportion graphs	5	
Interpret equations that describe direct and inverse proportion	5	

28 The densities of two different liquids A and B are in the ratio 19 : 22

The mass of 1 cm³ of liquid B is 1.1 g.

5 cm³ of liquid A is mixed with 15 cm³ of liquid B to make 20 cm³ of liquid C.

Work out the density of liquid C.

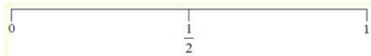
YEAR 10 SET 3 TO 5 SCHEME OF WORK - STATISTICS STRAND - SUMMER

week	strand	SUPPORT	LEARNING OUTCOME	GRADE
8	statistics	Data collection; sampling; probability scale	Understand the difference between: primary and secondary data, discrete and continuous data	3
			Design suitable data capture sheets for surveys and experiments	3
			Understand about bias in sampling and how to minimise it	3
			Choose and justify an appropriate sampling scheme, including random and systematic sampling	3
			Infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling	3
			Represent and compare probabilities on a number scale	2

6.

(c) There are three yellow sweets and one blue sweet in a bag. Graham takes at random a sweet from the bag.

On the probability scale, mark with a cross (x) the probability that he will take a blue sweet.

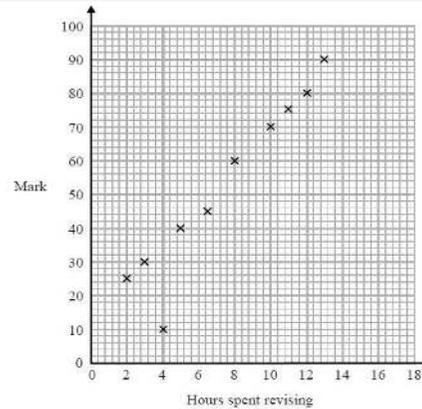


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CORE	LEARNING OUTCOME	GRADE
pie charts; scatter diagrams	Construct pie charts from a frequency table	3
	Interpret pie charts e.g. calculate the frequency when given the angle of a sector	3
	Draw and produce a scatter graph	3
	Appreciate that correlation is a measure of the strength of association between two variables	4
	Distinguish between positive, negative and zero correlation using a line of best fit	4
	Appreciate that zero correlation does not necessarily imply 'no correlation' but merely 'no linear relationship'	4
	Draw a line of best fit by eye and understand what it represents	4
	Use a line of best fit to interpolate and extrapolate (whilst knowing the dangers of doing so)	4
	Identify outliers	4

21 The scatter diagram shows information about 10 students.

For each student, it shows the number of hours spent revising and the mark the student achieved in a Spanish test.



One of the points is an outlier.

(a) Write down the coordinates of the outlier.

The Spanish test was marked out of 100

Lucia says,

"I can see from the graph that had I revised for 18 hours I would have got full marks."

(d) Comment on what Lucia says.

EXTENSION	LEARNING OUTCOME	GRADE
venn diagrams; mean from frequency tables	Interpret sets from venn diagrams	4
	Interpret sets of unions/intersections	4
	Construct venn diagrams when given information about unions/intersections	5
	Calculate the mean of data given in an ungrouped frequency distribution	3
	Understand and use the sigma notation for the mean of ungrouped, and grouped, data	3
	Use the mid interval value to find an estimate for the mean of data given in a grouped frequency distribution	4

24 Jenny works in a shop that sells belts.

The table shows information about the waist sizes of 50 customers who bought belts from the shop in May.

Belt size	Waist (w inches)	Frequency
Small	$28 < w \leq 32$	24
Medium	$32 < w \leq 36$	12
Large	$36 < w \leq 40$	8
Extra Large	$40 < w \leq 44$	6

(a) Calculate an estimate for the mean waist size.

Belts are made in sizes Small, Medium, Large and Extra Large.

Jenny needs to order more belts in June.

The modal size of belts sold is Small.

Jenny is going to order $\frac{3}{4}$ of the belts in size Small.

The manager of the shop tells Jenny she should **not** order so many Small belts.

(b) Who is correct, Jenny or the manager?
You must give a reason for your answer.