Mathematics Morning

How to achieve a Level 5 in Maths

Name: _____

Tutor Group: _____

Welcome to the Maths Morning…

This Booklet is designed to support you by showing you exactly what skills are needed to achieve a Level 5 in Mathematics.

It is important that you achieve a level 5 in Maths by the end of Year 9 as it will put you a step in the right direction towards achieving a grade C in Maths at GCSE. Maths plays a part in every subject at The de Ferrers Academy and to succeed in these subjects you need a good understanding of numeracy.

A grade C in Maths at GCSE will allow you to go forward onto any career path you choose. The de Ferrers Sixth Form as well as other local Sixth Form Colleges will only allow students to enrol onto their courses after achieving a C grade in Maths at GCSE. Other local college courses will require a strong GCSE Maths grade or they will require you to study it again on top of your new course (which means extra work for you).

The following pages will show you the key skills you need to master to achieve a Level 5 and some example questions so you can practice and make progress.

Maths outside of the Academy

 Task

Daniel is trying to save £10,000 so he can buy his first house.

He earns £1700 a month

Each month he currently spends the following:

- Rent £540

- Food £145

- Car & Fuel £245

- Bills £104

- Going out with friends £110
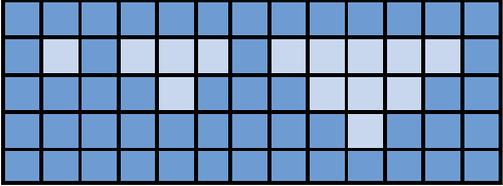
- Other expenses £156

How long will it take Daniel to save the money he needs?

Extra Challenge- What percentage of Daniels monthly earnings are used on outgoings?

Work your answer out here:

Achieving a Level 5- Mental and Written Calculations		
Skill	**Example Questions**	**My working and answers**
Multiply and divide whole numbers and decimals by 10, 100 or 1000	I divided a number by 100. The answer was 24.8. What was my number? A pack containing 1000 sheets of paper is 9.8 cm thick. What is the approximate thickness of one sheet? Explain how you can use the fact 7 × 8 = 56 to find the answer to 5.6 ÷ 0.8.	
Calculate with whole numbers and decimals, using mental and written methods	Kim knows that 137 × 28 = 3836. Explain how she can use this information to work out the multiplications: 138 × 28　　　137 × 27 Work out the missing digit: □92 ÷ 14 = 28 Shenaz buys a pack of 24 cans of cola for £6. What is the cost of each can? Work out: 100 − 3 × 22.5.	
Find fractions and percentages of numbers and quantities	Explain how you would find 35% of £60, without using a calculator. John says: 'I think three-eighths of a day is 10 hours.' Is he right? Work out which is larger: $^3/_5$ of 480 kg or $^7/_8$ of 320 kg.	
Addition and subtraction of negative numbers	At the north pole, the temperature is −25 °C. At the equator the temperature is 77 degrees higher. What is the temperature at the equator?	

Achieving a Level 5- Explanations of patterns and reasoning		
Skill	**Examples questions**	**My working and answers**
Describe a problem and identify the mathematics I needed to solve it	There are three airports on an island. Every day one aeroplane flies from each airport to each of the other airports. Use a diagram to make sense of the problem. How many flights are there each day? What if there were four airports, five airports...?	
Explain my mathematical thinking clearly and systematically, using words, diagrams, numbers and symbols	p and q each stand for whole numbers. $p + q = 1000$ and p is 150 greater than q. Calculate the values of p and q. Solve this problem, recording your thinking. Peter says that when you remove one square from the area of a shape, its perimeter will get smaller. Is this true sometimes, always or never? Justify your answer.	
Identify and describe patterns and use them to make predictions and general statements	 Describe the third shape to a friend, using words. Now describe the sequence. Explain how the sequence increases in size. How many squares are there in each picture? Predict and check how many squares there will be in the next picture. Use what you have found to suggest how many small squares would be in the 10th picture, the 100th, the nth.	

Write and use simple expressions in words and formulae	Write a formula for the 10th, 100th, nth term of the sequence: 3, 6, 9, 12, 15...	
	One bottle holds 5 glassfuls. How many glassfuls in 2 bottles, 20 bottles, x bottles? Write a formula showing the relationship between the number of glassfuls, g, and the number of bottles, b.	
	y stands for a number. Complete this table:	

y	$3y$	$3y + 1$
25		
		28

Extra working out space:

Achieving a Level 5- Fractions, ratio and proportion		
Skill	**Example questions**	**My working and answers**
Solve problems using ratio and proportion and use mathematical language to describe my method	A recipe for 4 people requires 200 g of butter. How much butter would you need for 2 people? 6 people? 5 people? Explain how you found the quantities of butter that were needed. Stan makes a fruit salad, using bananas, oranges and apples. For every one banana, he uses 2 oranges and 3 apples. Stan uses 24 items of fruit. How many oranges does he use?	
Solving problems involving fractions and percentages	Write the fraction of 8 into 2? Write the fraction of 8 into 12? What fraction of 80 are 20, 100 and 120? Tell me two quantities such that one is 25% of the other. Now give me two quantities such that one is 5% of the other. What about 40%?	
Simplifying fractions and ratios	Write $^{18}/_{24}$ in its simplest form. What did you do to simplify this fraction? What clues do you look for to reduce fractions to their simplest form? How do you know when you have the simplest form of a fraction? The ratio of fruit to cereal in a packet of *Tasty* is 40:60. Write this ratio in its simplest form.	

	The manufacturer wants to reduce the ratio of fruit to 35:65. Simplify this ratio .	
Find equivalent fractions, decimals and percentages	Would you rather have $^3/_4$ or $^5/_6$ of the same bar of chocolate? Explain your choice. Which of these represent equivalent amounts? 0.4 $^1/_3$ 60% 3/4 0.2 90% 40% 0.3 3/5 0.3 0.75 0.6 0.25 0.9	

Achieving Level 5-Multi-step problems		
Skill	**Examples Questions**	**My working and answers**
Solving problems involving more than one step, identifying the appropriate operation for each step	Every 100 g of brown bread contains 6 g of fibre. A loaf of bread weighs 800 g and has 20 equal slices. How much fibre is there in one slice? How many 250 ml cups of tea can you pour from a tea urn that holds 8.5 litres? 50 000 people visited a theme park in one year. 15% of the people visited in April and 40% of the people visited in August. How many people visited the park in the rest of the year? Work out: 4 + 4 ÷ 4 + 4 and 5 − 2 × 3 + 4. Does your calculator give the same answers as you found?	
Checking that my answer to a problem sounds sensible	Steph wants to cut 4.55 m of ribbon into 25 cm strips. She wants to know if she had enough ribbon for 24 strips. She used a calculator to divide 4.55 by 24 and got an answer of 0.189 583 3. How could she use this calculation to help her decide if she had enough ribbon? If an isosceles triangle has one angle of 50°, what are the other two angles? Sam joins together two of these triangles to form a quadrilateral. He says he has a rhombus with an angle of 100°. Is he right?	

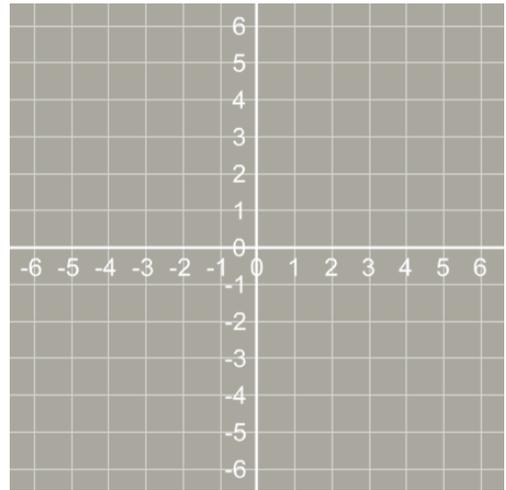|		
Presenting my solutions to a problem clearly, both orally and in writing	The area of a rectangle is 24 cm². One of the sides is 3 cm long. What is the perimeter of the rectangle? If another rectangle with the same area had a side of 4 cm, would the perimeter be bigger too? Explain your thinking and record how you worked out the answer to this problem. I think of a number. I find $^1/_3$ of it then add 60. My answer is 85. What number did I think of? Explain how you can solve this problem. Make up and solve and share similar problems.	

Extra working out space:

Achieving Level 5- Shape and angle properties		
Skills	**Examples questions**	**My working and answers**
Describing 2-D and 3-D shapes, using accurate mathematical vocabulary	Visualise a hexagonal prism. How many faces does it have? What shape are they? Are any of the faces parallel to each other? Visualise two identical equilateral triangles placed side by side so that the edge of one matches exactly with the edge of the other. Describe the shape that they make together.	
Using knowledge of shape properties to solve problems	Describe how you could change this shape into a kite by moving one point. What about a rhombus? A non-isosceles trapezium?	
Using knowledge of angle facts to work out angles in shapes and diagrams	What is the angle between the hands of a clock at four o'clock? Explain how you know. Look at this diagram of an isosceles triangle. Calculate the value of *x*. Do not use a protractor (angle measurer).	

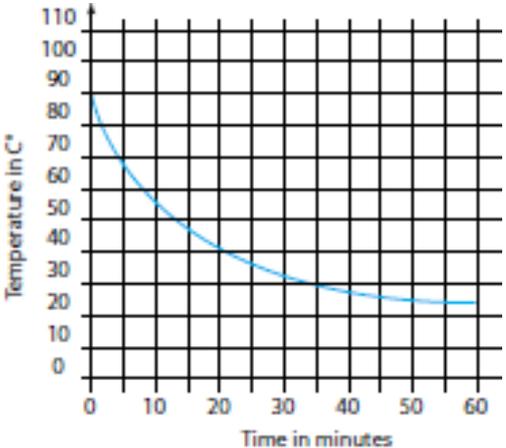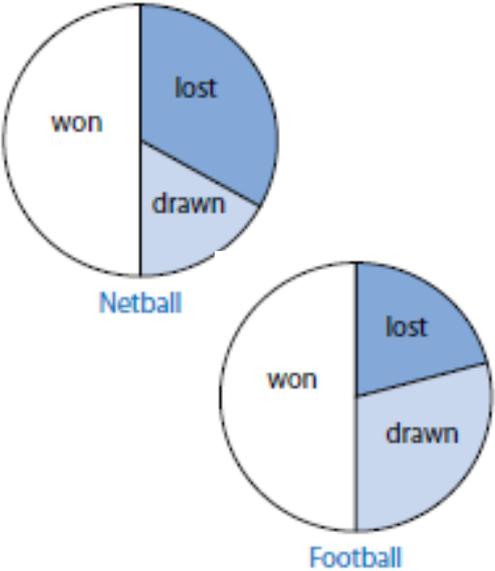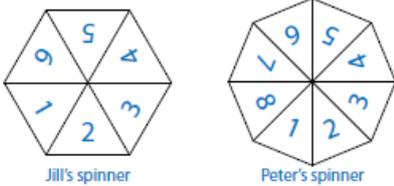| Answering questions about coordinates in all four quadrants | Draw the shape with the coordinates (−5, 1) (−4, −1) (−5, −4) (−6, −1).

Describe the properties of this shape. Can you create the same shape in a position where all of the coordinates will be positive? | |

I

Extra working out space:

Achieving Level 5- Graphs and outcomes		
Skills	**Examples questions**	**My working and answers**
Create line graphs and use them to answer questions	In a science experiment, a hot liquid is left to cool. This graph shows how the temperature of the liquid changes as it cools. Read from the graph how many minutes it takes for the temperature to reach 40 °C and for how many minutes the temperature is above 60 °C.	
Interpret data in graphs and charts and use this to answer questions and draw conclusions	The pie charts show the results of a school's netball and football matches. The netball team played 30 games. The football team played 24 games. Estimate the percentage of games that the netball team lost. David says: 'The two teams won the same number of games.' Is he correct? Explain how you know.	
Explain why events are equally likely and use this to find the probability of outcomes	Here are two spinners. Jill says: 'I am more likely than Peter to spin a 3.' Is Jill correct? Explain your reasoning. Peter says: 'We are both equally likely to spin an even number.' Is Peter correct? Explain your reasoning.	

12

Use range, mode, median or mean to compare two sets of data and explain what they tell you	A group of children take the same spelling test twice, once in January and again a month later. Their scores in January are: 16, 13, 18, 13, 12, 16, 17 and in February they are: 15, 13, 20, 12, 20, 20, 12. How would you describe the group's progress in spelling from January to February? Justify your answer, making reference to the range, median, mean and mode.	

Notes