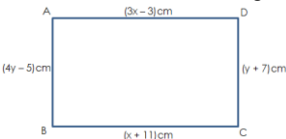
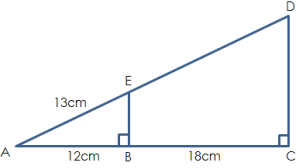
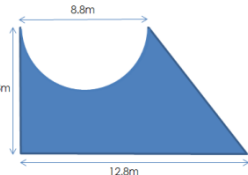
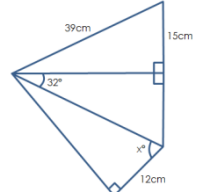
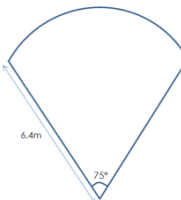


A BIT OF MATHS EACH DAY – HIGHER TIER – OCTOBER 2018

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
1 st	2 nd	3 rd	4 th	5 th	6 th	7 th
<p>(a) Make p the subject in the formula $r = 6p^2 - 9$</p> <p>(b) Find p if $r = 375$</p>	<p>X is indirectly proportional to the square root of Y. When $X = 1.2$, $Y = 100$.</p> <p>(a) Find an equation connecting X and Y. (b) What will Y be when $X = 60$?</p>	<p>(a) Work out the reciprocal of 0.875</p> <p>(b) Calculate the following $\frac{\sqrt{78} + 5.6^2}{5.2 \times 1.5^2}$</p> <p>Giving your answer correct to: (i) 3 d.p. (ii) 3 s.f.</p>	<p>Solve the inequality $6x^2 > x + 1$</p>	<p>(a) Danielle wins £4000 on the lottery. She invests it in a bank account which pays interest at the rate of 1.75% per annum. How much will her initial £4000 have gained after 3 years?</p> <p>(b) Last year she had another win in the lottery. She invested this in a different account which paid 2% interest per annum. She currently has £1591.20 in this account. How much did she win last year on the lottery?</p>	<p>(a) Solve the equation $3x^2 - 5x - 6 = 0$ giving your answers correct to 2 decimal places.</p> <p>(b) Saul is solving a different equation using the quadratic formula. His correct working so far reads $x = \frac{7 \pm \sqrt{57}}{4}$ What equation is Saul trying to solve?</p>	
<p>(a) Write $x^2 - 6x + 10$ in the form $(x + a)^2 + b$.</p> <p>(b) Explain why the equation $x^2 - 6x + 10 = 0$ does not have a solution.</p> <p>(c) What is the coordinate of the turning point of the graph $y = x^2 - 6x + 10$?</p>	<p>Doreen inherits £12000 from her Uncle. She decides to invest it in a bank account which pays 2% interest for the first year and then x% compound interest per annum after that.</p> <p>After 4 years she has £12761.31 in her bank account. What is the value of x to 1 decimal place?</p>	<p>The circle with equation $x^2 + y^2 = 80$ intersects with a line with equation $x + y = 4$ at the points A and B.</p> <p>Find the distance between points A and B, giving your answer correct to 2 decimal places.</p>	<p>A council is attempting to estimate the rabbit population in a particular forest. They catch 50 rabbits and tag them all. They then release them.</p> <p>A couple of weeks later they catch 120 rabbits. 7 had tags on them. Estimate the rabbit population of the forest.</p>	<p>ABCD is a rectangle. Find the area of the rectangle.</p> 	 <p>Triangle ABE and ACD are mathematically similar. Find the area of trapezium BCDE.</p>	
<p>(a) Paul produces this working when solving an equation $8(2x + 3) = 28$ $16x + 24 = 28$ $16x = 4$ $x = 4$</p> <p>Paul has made a mistake. What mistake has he made?</p> <p>(b) Solve the equation $4(2x - 1) + 2(3x + 5) = 2(2x - 7)$</p>	<p>WITHOUT using a calculator, work out exact values for</p> <p>(a) $(\frac{5}{9})^{-2}$</p> <p>(b) $64^{2/3}$</p> <p>(c) $(\frac{1000}{27})^{-5/3}$</p>	<p>(a) Solve the inequality $3x + 7 > 1$</p> <p>(b) Solve the inequality $-9 \leq 2x - 1 < 7$</p> <p>(c) Which integer values satisfy BOTH inequalities in parts (a) and (b)?</p>	<p>(a) The nth term of a particular sequence is $\frac{n^2 + 3n - 5}{4n - 3}$</p> <p>Find the 20th term in the sequence.</p> <p>(b) A different sequence is $-2, -1, 4, 13, 26, 43$</p> <p>Find the nth term of this sequence.</p>	<p>The diagram shows the plan of a garden. The shaded area is to have a wooden border placed around it and is to be gravelled. The border is sold in 2m strips costing £4.45 each and the gravel is sold in bags which cover 5m² costing £11.85 each. How much will it cost to place a border around and gravel the garden?</p> 		
<p>(a) Write 8940000 as a number in standard form</p> <p>(b) Write 9.12×10^{-3} as a normal number.</p> <p>(c) The distance between Jupiter and Earth is 5.88×10^8 km. Light travels at 3×10^8 metres per second. How long does light take to travel from Jupiter to Earth? Give your answer to the nearest minute.</p>	 <p>Find the value of x to 2 d.p.</p>	<p>$f(x) = 4x - 3$</p> <p>(a) Find an expression for $f^{-1}(x)$ $g(x) = 2x^2 + 7$</p> <p>(b) Evaluate $fg(4)$</p> <p>(c) Solve the equation $gf(x) = 9$</p>	<p>Solve the pair of simultaneous equations $3x + 5y = 14$ $4x - 3y = -20$</p>	<p>$\frac{ax^2 + bx + c}{dx^2 + e}$ can be simplified to $\frac{x + 3}{3x + 1}$</p> <p>What are the values of the integers a, b, c, d and e?</p>	 <p>The diagram shows the plan of a garden. The garden is to be filled with gravel. A bag of gravel costs £6.99 excluding VAT and covers 2.5m². There is an offer on which gives 15% off before the VAT has been added. How much will it cost to gravel the garden with the offer and after VAT at 20% has been added?</p>	
<p>(a) Expand and simplify fully $(2x + 3)(x - 4)$</p> <p>(b) Factorise fully $24a^2b^4 - 16b^3$</p> <p>(c) Solve the equation $x^2 + 3x - 10 = 0$</p>	<p>Prove that $(3x + 4)^2 - (3x - 4)^2$ is a multiple of 16 for all positive integer values of x.</p>	<p>(a) Show that $y = x^3 - x^2 - 9x - 4$ has a root, β, in the range $3 < \beta < 4$.</p> <p>(b) Use the iterative formula $x_{n+1} = \sqrt[3]{x_n^2 + 9x_n + 4}$ three times, with $x_0 = 3.5$ to find an approximation to a root to $y = x^3 - x^2 - 9x - 4$.</p>	<h1 style="color: red; font-size: 2em;">October Calculator</h1>	<p>The best way to learn mathematics is to DO mathematics.</p> <p>If you do something regularly on a daily basis you will make a bigger difference than leaving it till just before your exams.</p> <p>If you need help there are some fantastic videos at www.corbettmaths.com</p> <p>Or you can always tweet me @mrchadburn</p>		