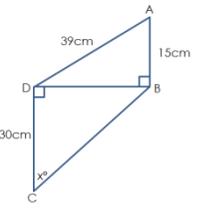
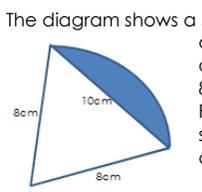
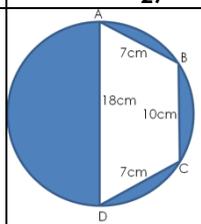
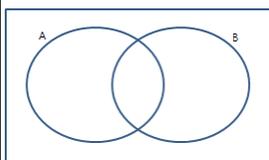


## A BIT OF MATHS EACH DAY – HIGHER TIER – APRIL 2017 – CALCULATOR

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY												
					1st	2nd												
<h1 style="color: red; font-size: 2em; margin: 0;">April Calculator</h1>		<p>The best way to learn mathematics is to DO mathematics. If you do something regularly on a daily basis you will make a bigger difference than leaving it till just before your exams. If you need help there are some fantastic videos at <a href="http://www.corbettmaths.com">www.corbettmaths.com</a> Or you can always tweet me @mrchadburn <b>This is the final calendar before the GCSE exams. Good luck with your exams!!</b></p>			<p>The first 7 terms of the Tribonacci Sequence are 1, 1, 1, 3, 5, 9, ... The rule to continue the Tribonacci Sequence is "the next term in the sequence is the sum of the previous 3 terms". (a) Write down the next 3 Tribonacci numbers. (b) The first four terms of a different tribonacci sequence are a, a, b, 2a+b. Show that the 7th term is 10a + 7b (c) The fourth term is 21 and the 7th term is 123. Find the values of a and b.</p>													
3rd	4th	5th	6th	7th	8th	9th												
<p>Annette is travelling to Switzerland. The exchange rate between British Pounds (£) and Swiss Francs (CHF) is £1 = 1.18CHF. She converts £840 into Swiss Francs. When in Switzerland she spends 712CHF. When she returns, the exchange rate is 1CHF = £0.90. What percentage of her original £840 has she got left after converting it back into pounds?</p>	<p>Show that <math>\frac{1}{6x^2 + 5x - 4} \div \frac{1}{9x^2 - 16}</math> simplifies to <math>\frac{ax + b}{cx + d}</math> where a, b, c and d are integers to be found.</p>	<p>Rose, Steve and Terry shared some sweets. Steve received 25% more than Rose. Rose and Terry's share was in the ratio 4 : 9. Steve received 20 sweets. How many sweets in total did the three receive?</p>	<p>A circle has an equation <math>x^2 + y^2 = 13</math>. A line with an equation <math>x - 2y = 1</math> intersects the circle at points A and B. Find the coordinates of A and B.</p>	<p>(a) Expand and simplify fully <math>(3x + 7)(2x - 9)</math> (b) Factorise fully <math>24x^3y^2 - 18x^2y</math> (c) Solve <math>x^2 + 3x - 108 = 0</math></p>	<p>(a) Show that the equation <math>x^3 - 3x = 42</math> has a solution between <math>x = 3</math> and <math>x = 4</math>. (b) Show that the equation <math>x^3 - 3x = 42</math> can be re-arranged to give <math>x = \sqrt{\frac{42+3x}{x}}</math>. (c) Starting with <math>x_0 = 3.5</math> use the iteration formula <math>x_{n+1} = \sqrt{\frac{42+3x_n}{x_n}}</math> three times to find an estimate for the solution to <math>x^3 - 3x = 42</math>.</p>													
10th	11th	12th	13th	14th	15th	16th												
<p><math>b = \frac{c}{\sqrt{d}}</math> <math>c = 32.72</math> (correct to 4 s.f.) <math>d = 3210</math> (correct to 3 s.f.) By considering the bounds of accuracy of c and d, find the value of b to an appropriate degree of accuracy. Give a reason for your answer.</p>	<p>Dorothy puts £4000 in the bank for three years. Her bank pays compound interest at the rate of 2% for the first year X% for the second year X% for the third year. At the end of 3 years she has £4203.82 in her account. Work out the interest rate in the 2nd year.</p>	<p>(a) Find the nth term for the sequence 7, 11, 15, 19, 23, 27, ... (b) Paul says that 325 is in both the sequence in (a) and the sequence with nth term <math>8n - 9</math>. Is Paul correct? Explain your reasoning.</p>	<p>Rachael asked 50 people whether they liked Chinese, Indian or Pizza as a take away. 4 like all three. 7 like Chinese and Indian 9 like Indian and Pizza 6 like Chinese and Pizza 22 like Indian 19 like Chinese 22 like Pizza. Rachael chose one person at random. What is the probability they <b>didn't like any</b> of the three take away meals?</p>	<p>Prove algebraically that <math>0.20\bar{6} = \frac{31}{150}</math></p>	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>A frustum is made by removing a small cone from a larger one. This frustum is made of a material with a density of 2.7g/cm<sup>3</sup>. Work out the mass of the frustum.</p> <p>Volume of a cone = <math>\frac{1}{3}\pi r^2 h</math></p> </div> </div>													
17th	18th	19th	20th	21st	22nd	23rd												
<p>A function, f is such that <math>f(x) = 2x + 7</math>. (a) Find <math>f(12)</math> (b) Find <math>f^{-1}(x)</math> Another function, g is such that <math>g(x) = ax^2 + 2</math>. (c) Given that <math>gf(3) = 509</math>, find the value of a.</p>	 <p>Find the size of angle x.</p>	<p>Solve the equation <math>3 - 7x - 2x^2 = 0</math> giving your answers correct to 3 decimal places.</p>	<p>Prove that <math>(3n + 1)^2 - (3n + 1)</math> is a multiple of 3 for all positive values of n.</p>	<p>R is indirectly proportional to the cube of M. When <math>R = 0.16</math>, <math>M = 5</math>. (a) Find an equation connecting R and M. (b) Find M when <math>R = 2500</math>.</p>	<p>The hand span (in cm) of 60 men was measured. The results are shown in the table.</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Handspan, h, cm</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td><math>10 \leq h &lt; 14</math></td> <td>3</td> </tr> <tr> <td><math>14 \leq h &lt; 18</math></td> <td>17</td> </tr> <tr> <td><math>18 \leq h &lt; 22</math></td> <td>19</td> </tr> <tr> <td><math>22 \leq h &lt; 26</math></td> <td>12</td> </tr> <tr> <td><math>26 \leq h &lt; 30</math></td> <td>9</td> </tr> </tbody> </table> <p>(a) What group does the median lie in? (b) Find an estimate for the mean hand span.</p>		Handspan, h, cm	Frequency	$10 \leq h < 14$	3	$14 \leq h < 18$	17	$18 \leq h < 22$	19	$22 \leq h < 26$	12	$26 \leq h < 30$	9
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<p>(a) Solve the equation <math>4(2x - 3) = 5(4 - 5x)</math> (b) Make m the subject of <math>r = \frac{m^2}{n} + p</math></p>	<p>The diagram shows a sector of a circle of radius 8cm. Find the shaded area.</p> 	<p>(a) Solve the inequality <math>5x - 9 &lt; 2x + 3</math> (b) Solve the inequality <math>x^2 + 9x \geq 36</math></p>	 <p>The shape shows a circle of diameter AD = 18cm with a trapezium with AD and BC parallel. BC = 10cm. AB = CD = 7cm. What percentage of the circle is shaded?</p>	<p>The curve with equation <math>y = ab^x</math> is drawn. The points C and D with coordinates (1, 21) and (4, 567) lie on the curve respectively. Find the values of the integers a and b.</p>	 <p><math>E = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15\}</math> <math>A = \{\text{Factors of } 56\}</math> <math>B = \{\text{Prime numbers}\}</math> (a) Explain in words what i. <math>A \cup B</math> and ii. <math>A \cap B</math> mean (b) Complete the Venn Diagram (c) Write down the probability of i. <math>A \cup B</math> and ii. <math>A \cap B</math></p>													