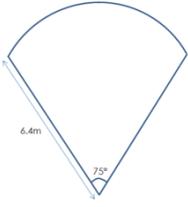
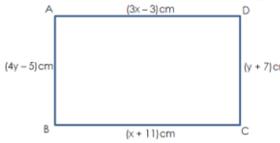
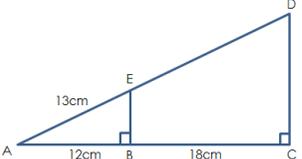
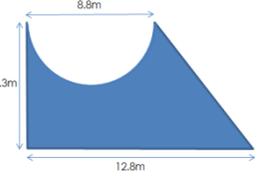
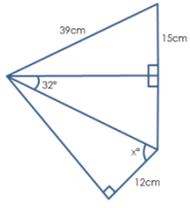


A BIT OF MATHS EACH DAY – HIGHER TIER – OCTOBER 2017

| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|--|--|--|--|---|------------------|
| 30 th | 31 st | | | | 30 th September | 1 st |
| (a) Expand and simplify fully $(2x + 3)(x - 4)$ (b) Factorise fully $24a^2b^4 - 16b^3$ (c) Solve the equation $x^2 + 3x - 10 = 0$ | Prove that $(3x + 4)^2 - (3x - 4)^2$ is a multiple of 16 for all positive integer values of x. | <h1 style="color: red; font-size: 2em;">October Calculator</h1> | 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 www.corbettmaths.com Or you can always tweet me @mrchadburn |  <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> | | |
| 2 nd | 3 rd | 4 th | 5 th | 6 th | 7 th | 8 th |
| (a) Make p the subject in the formula $r = 6p^2 - 9$ (b) Find p if r = 375 | X is indirectly proportional to the square root of Y. When X = 1.2, Y = 100. (a) Find an equation connecting X and Y. (b) What will Y be when X = 60? | (a) Work out the reciprocal of 0.875 (b) Calculate the following $\frac{\sqrt{78} + 5.6^2}{5.2 \times 1.5^2}$ Giving your answer correct to: (i) 3 d.p. (ii) 3 s.f. | Solve the inequality $6x^2 > x + 1$ | (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? (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? | (a) Solve the equation $3x^2 - 5x - 6 = 0$ giving your answers correct to 2 decimal places. (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? | |
| 9 th | 10 th | 11 th | 12 th | 13 th | 14 th | 15 th |
| (a) Write $x^2 - 6x + 10$ in the form $(x + a)^2 + b$. (b) Explain why the equation $x^2 - 6x + 10 = 0$ does not have a solution. (c) What is the coordinate of the turning point of the graph $y = x^2 - 6x + 10$? | 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. After 4 years she has £12761.31 in her bank account. What is the value of x to 1 decimal place? | The circle with equation $x^2 + y^2 = 80$ intersects with a line with equation $x + y = 4$ at the points A and B. Find the distance between points A and B, giving your answer correct to 2 decimal places. | 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. A couple of weeks later they catch 120 rabbits. 7 had tags on them. Estimate the rabbit population of the forest. | ABCD is a rectangle. Find the area of the rectangle.  |  <p>Triangle ABE and ACD are mathematically similar. Find the area of trapezium BCDE.</p> | |
| 16 th | 17 th | 18 th | 19 th | 20 th | 21 st | 22 nd |
| Make m the subject of the formula $r = \frac{3m - 1}{2 - m}$ | (a) Paul produces this working when solving an equation $8(2x + 3) = 28$ $16x + 24 = 28$ $16x = 4$ $x = 4$ Paul has made a mistake. What mistake has he made? (b) Solve the equation $4(2x - 1) + 2(3x + 5) = 2(2x - 7)$ | WITHOUT using a calculator, work out exact values for (a) $(\frac{5}{9})^{-2}$ (b) $64^{2/3}$ (c) $(\frac{1000}{27})^{-5/3}$ | (a) Solve the inequality $3x + 7 > 1$ (b) Solve the inequality $-9 \leq 2x - 1 < 7$ (c) Which integer values satisfy BOTH inequalities in parts (a) and (b)? | (a) The nth term of a particular sequence is $\frac{n^2 + 3n - 5}{4n - 3}$ Find the 20 th term in the sequence. (b) A different sequence is -2, -1, 4, 13, 26, 43 Find the nth term of this sequence. | 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 5m ² costing £11.85 each. How much will it cost to place a border around and gravel the garden?  | |
| 23 rd | 24 th | 25 th | 26 th | 27 th | 28 th | 29 th |
| (a) Write 8940000 as a number in standard form (b) Write 9.12×10^{-3} as a normal number. (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>Find the value of x to 2 d.p.</p> | $f(x) = 4x - 3$ (a) Find an expression for $f^{-1}(x)$ $g(x) = 2x^2 + 7$ (b) Evaluate $fg(4)$ (c) Solve the equation $gf(x) = 9$ | Solve the pair of simultaneous equations $3x + 5y = 14$ $4x - 3y = -20$ | $\frac{ax^2 + bx + c}{dx^2 + e}$ can be simplified to $\frac{x + 3}{3x + 1}$ What are the values of the integers a, b, c, d and e? | (a) Show that $y = x^3 - x^2 - 9x - 4$ has a root, β , in the range $3 < \beta < 4$. (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 $y = x^3 - x^2 - 9x - 4$. | |