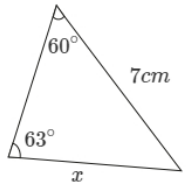
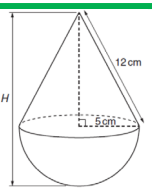
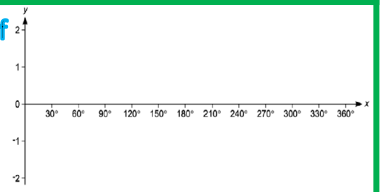
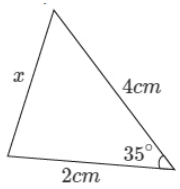
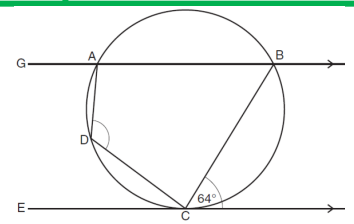
SIGMA TRUST

September 2020 – Higher Questions

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
MATHEMATICS is not about numbers, equations, computations, or algorithms: it is about **UNDERSTANDING.** *William Paul Thurston*	1 **Work out:** $\left(\frac{16}{25}\right)^{-\frac{3}{2}}$	2 **3, 8, 15, 24** Write an expression for the nth term.	3 **Solve:** $3x^2 + 5x - 11 = 0$ Give your answer correct to 2dp.	4 **Write:** $x^2 - 6x + 3$ In the form $(x-a)^2 + b$	5 a) Show that $x^3 + 4x = 1$ can be written as $x = \frac{1}{4} - \frac{x^3}{4}$ b) Use the iteration formula $x_{n+1} = \frac{1}{4} - \frac{x_n^3}{4}$, to find the next 3 values. $x_0 = 1$	6
7 Find x 	8 Find the height & volume of the shape. 	9 y is inversely proportional to x, when y = 40 & x = 1. Find y when x = 4.	10 Write $0.\dot{4}\dot{5}$ as a fraction in its simplest form.	11 **Solve simultaneously:** $2x + 4y = 36$ $3x - 7y = -24$	12 Sketch the graph of $y = sinx$ for $0 \leq x \leq 360$ 	13
14 **Solve simultaneously:** $y = 2x^2 + 16x - 9$ $y = 5x - 3$	15 **Factorise:** $4x^2 - 9y^2$	16 Find x 	17 **Expand & Simplify:** $(4+\sqrt{3})(1+\sqrt{3})$	18 **Find the turning point of:** $x^2 + 8x - 2$	19 A lift can safely take a total weight of 600kg, to the nearest 10kg. Can you be certain 8 people, each weighing 75kg, to the nearest kg, can safely travel in the lift?	20
21 Prove algebraically that the sum of 4 consecutive whole numbers will always be even.	22 Frazer is using the quadratic formula and gets: $x = \frac{-3 \pm \sqrt{9-(-48)}}{4}$ Find $ax^2 + bx + c$	23 Find $f^{-1}(x)$: $f(x) = \frac{5x-4}{9}$	24 **Factorise:** $15x^2 + x - 2$	25 y is directly proportional to x^3, when y = 24 & x = 2. Find y when x = 3.	26 Work out angle ADC. 	27
28 Simplify to be in the form $k\sqrt{2}$, where k is an integer. $8\sqrt{50} + \frac{30}{\sqrt{2}}$	29 A circle has an equation: $x^2 + y^2 = 75$ Find the diameter of the circle.	30 **Expand & Simplify:** $(2x+5)(3x+7)^2$	Remember if you are not sure speak to your maths teacher or go to your online resources for some extra help!			