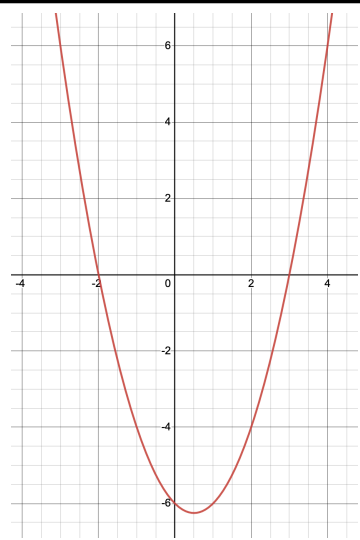
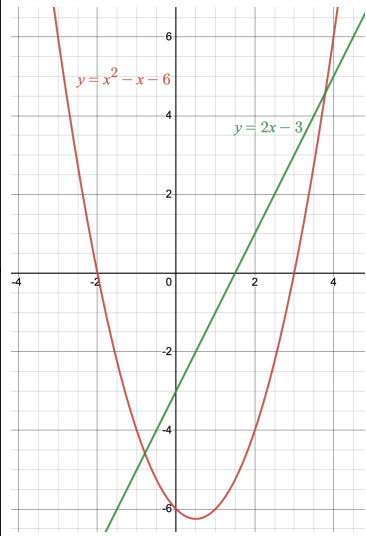
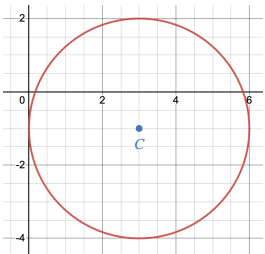
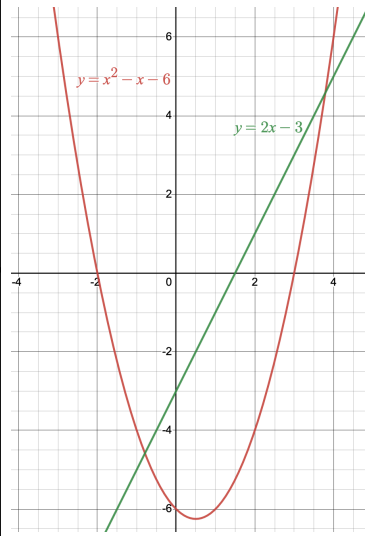

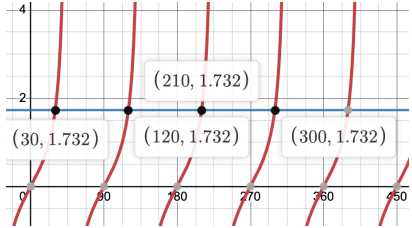
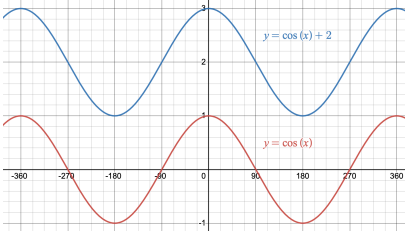


AQA Level 2 Further Mathematics Warmup - Paper 1 2023

Rationalise the denominator $\frac{\sqrt{3}}{2 + 3\sqrt{3}}$	What is the turning point of the quadratic $y = 3x^2 + 9x + 2$?	Find the equation of the line parallel to $2x + 3y = 4$ which passes through $(2,3)$	Differentiate $y = x^2(x + 3)$	$\begin{pmatrix} 2 & 1 \\ 3 & 1 \end{pmatrix} \begin{pmatrix} 5 & 1 \\ 2 & 2 \end{pmatrix}$
Find the second derivative of $f(x) = 3x^4 + 2x^3 + 3x$	Find the first 3 terms of the sequence $u_n = \frac{4n - 1}{3n}$ and the limiting value of u_n as $n \rightarrow \infty$	What is the matrix representing a reflection in the line $y = x$?	The graph to the right shows $y = x^2 - x - 6$. What is the line of symmetry?	
Find a and b such that $\begin{pmatrix} 2 & 5 \\ 3 & 1 \end{pmatrix} \begin{pmatrix} 7 \\ a \end{pmatrix} = \begin{pmatrix} b \\ 23 \end{pmatrix}$	Sketch the circle $(x - 3)^2 + (y + 1)^2 = 9$ and state its radius and centre.	Sketch the graphs $y = \tan(2x)$ and $y = \sqrt{3}$ on the same axes.	By drawing a straight line on the graph to the right find approximate solutions for $x^2 - 3x + 3 = 0$	
Sketch the piecewise function $f(x) = \begin{cases} x & 0 \leq x \leq 2 \\ x^2 - 2 & 2 \leq x \leq 3 \\ -2x + 13 & 3 \leq x \leq 6 \end{cases}$	Expand $(2 + 3x)^4$	Solve $\tan(2x) = \sqrt{3}$ for $0^\circ \leq x \leq 360^\circ$	Simplify $\frac{9x^2 - 16}{6x^2 + 5x - 4}$	Find the n th term of the sequence 3, 4, 7, 12, 15
Express $2 \sin^2(x) + 3 \cos^2(x) + 5 \cos(x) - 3$ in terms of powers of $\cos(x)$ only.	Sketch $y = \cos(x)$ for $-360^\circ \leq x \leq 360^\circ$	Find the length of the line segment joining $A(2,5)$ to $B(6,12)$	Find the tangent to the function $y = x^3 - 2x$ at the point $x = 1$	Solve the simultaneous equations $\begin{cases} x + y + z = 6 \\ 2x + 2y - z = 3 \\ 2x - y + 3z = 9 \end{cases}$

AQA Level 2 Further Mathematics Warmup - Paper 1 2023

$\frac{9}{23} - \frac{2\sqrt{3}}{23}$	$y = 3\left(x + \frac{3}{2}\right)^2 - \frac{19}{4} \text{ so}$ $\left(-\frac{3}{2}, -\frac{19}{4}\right)$	$2x + 3y = 13$	$y = x^3 + 3x^2 \text{ so}$ $\frac{dy}{dx} = 3x^2 + 6x$	$\begin{pmatrix} 12 & 4 \\ 17 & 5 \end{pmatrix}$
$f''(x) = 36x^2 + 12x$	$u_1 = 1, \quad u_2 = \frac{7}{6}, \quad u_3 = \frac{11}{9}$ <p style="text-align: center;">Limiting value is $\frac{4}{3}$</p>	$\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$	$x = \frac{1}{2}$	
$a = 2$ $b = 24$		$x = 30^\circ, 120^\circ, 210^\circ, 300^\circ$	<p style="text-align: center;">Plot $y = 2x - 3$</p> $x \approx -0.791 \text{ and}$ $x \approx 3.791$	
	$16 + 96x + 216x^2 + 216x^3 + 81x^4$		$\frac{3x - 4}{2x - 1}$	$n^2 - 2n + 4$
$\cos^2(x) + 5 \cos(x) - 1$		$\sqrt{65} \approx 8.06$	$\frac{dy}{dx} = 3x^2 - 2$ <p style="text-align: center;">Equation of the tangent is $y = x - 2$</p>	$x = 1$ $y = 2$ $z = 3$