AQA Level 2 Further Mathematics Warmup - Paper 2 2022

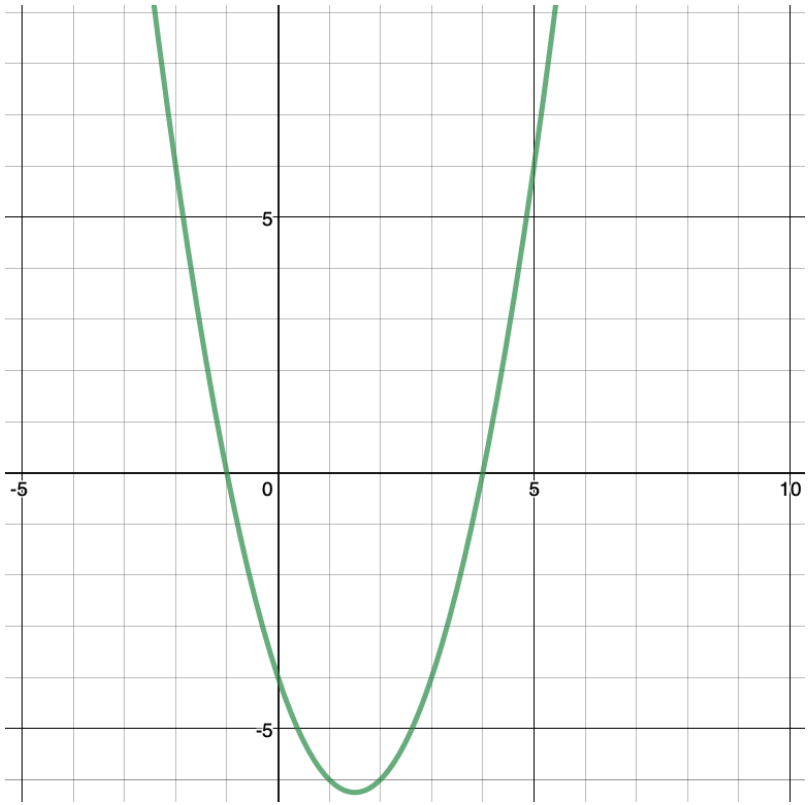
What quadratic function is shown on the grid below?

By adding a linear function to the graph shown solve the equation $x^2 - x - 6 = 0$

Factorise
$(x-3)^2(x+4) + 4(x-3)^3$

Solve $x^2 - 2x - 3 \geq 0$

The destination tower of a cable car is 169m above the base tower. The towers are 632 m apart. Find the angle of elevation.



Three points on the plane $A(3,2)$, $B(4,7)$ and $C(8,5)$ form a triangle.

a) Find the length $|AB|$.
b) Find the length $|BC|$.
c) Find the acute angle between AB and BC.
d) Find the area of the triangle.

Factorise
$2x^2 - 3xy - 20y^2$

Expand
$(x^2 + x - 1)(x^2 + 2x - 3)$

State the factor theorem.

John and Beryl are making citrus pressé. They are using different recipes. John buys 3 oranges and 2 lemons for £1.34 and Beryl buys 5 oranges and 1 lemon for 1.72. Given that they buy these from the same shop find the cost of each orange and lemon.

Find the rate of change of
$y = (2x+1)^2(x+3)$
when $x = 2$

The matrix M represents a rotation by $180°$ followed by reflection in the line $y = x$. What is M?

Expand
$(3+x)(x+1)(x-2)$

Find the coordinate of the turning point and the equation of the line of symmetry of the above graph.

How many times does the circle centre $(3,3)$ and radius 5 intersect the parabola shown above? What is the equation of this circle?

Sketch the graph
$y = 2^x$

Solve
$$2a + b + c = 8$$
$$6a + 2b - c = 5$$
$$2a + 2b + 2c = 15$$

$(x+4)$ and $(2x-1)$ are both factors of $2x^3 + ax^2 + bx - 8$. Find a and b

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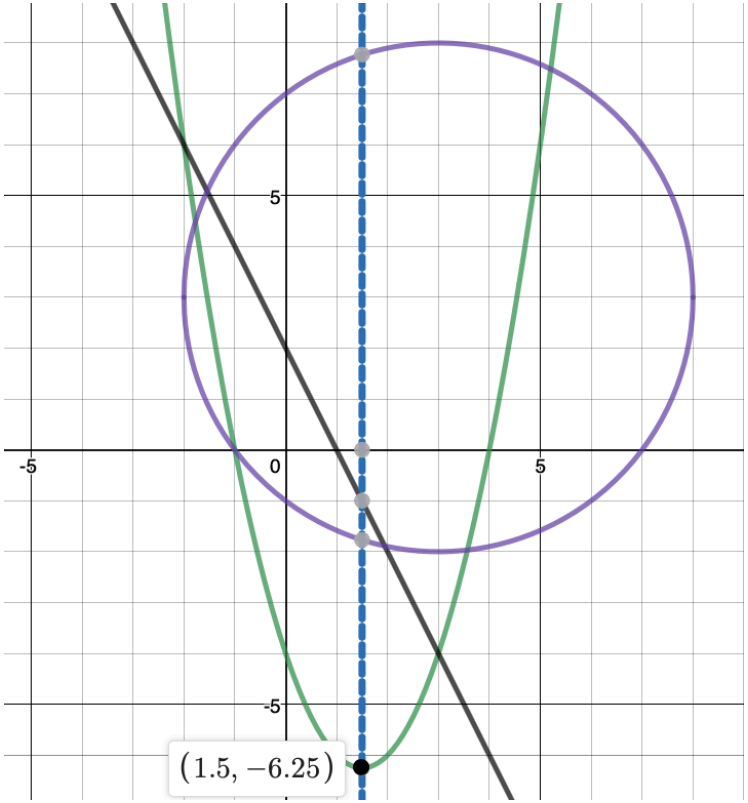
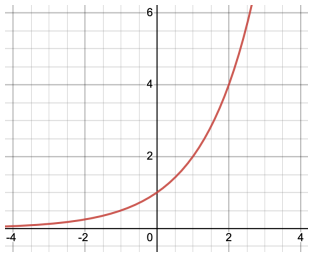
$y = x^2 - 3x - 4$	Plot the line $y = -2x + 2$. Solutions are $x = -2$ and $x = 3$	$(x-3)^2(5x-8)$	$-1 \leq x \leq 3$	$14.97°$
	a) ≈ 5.1 b) ≈ 4.47 c) $\approx 74.74°$ d) ≈ 11	$(2x+5y)(x-4y)$	$x^4 + 3x^3 - 2x^2 - 5x + 3$	
		If $(x-a)$ is a factor of the polynomial $p(x)$, then $p(a) = 0$ and $x = a$ is a root of the equation $p(x) = 0$. Conversely if $p(a) = 0$, then $(x-a)$ is a factor of $p(x)$.	Orange costs 30p and a lemon costs 22p.	
	$(2x+1)^2(x+3) = 4x^3 + 16x^2 + 13x + 3$ $\frac{dy}{dx} = 12x^2 + 32x + 13$ when $x = 2$, $\frac{dy}{dx} = 125$	$\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix} = \begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$	$x^3 + 2x^2 - 5x - 6$	
$\left(\frac{3}{2}, \frac{25}{4}\right)$ $x = \frac{3}{2}$	4 times. $(x-3)^2 + (y-3)^2 = 25$		$a = \frac{1}{2}$ $b = 3$ $c = 4$	$a = 11$ $b = 10$