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A LEVEL MATHS

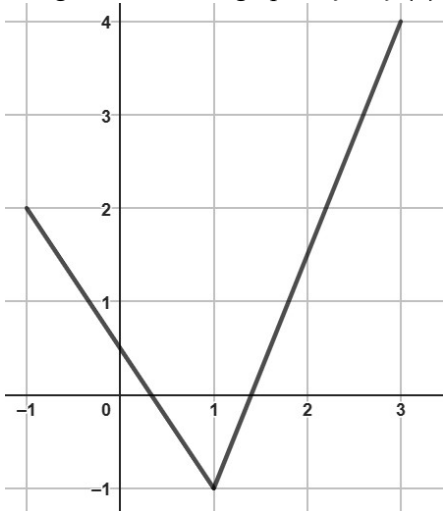
(23) Transforming Graphs (Translations)

WORKING AT D/E

(1) (a) Sketch the graph of $y = x^3$
(b) Hence sketch the graph of $y = (x + 5)^3$
(c) Hence sketch the graph of $y = x^3 + 3$

(2) $f(x) = (x - 2)^2 + 1$
(a) Sketch $y = f(x)$
(b) Sketch $y = f(x + 2)$
(c) Sketch $y = f(x) - 4$

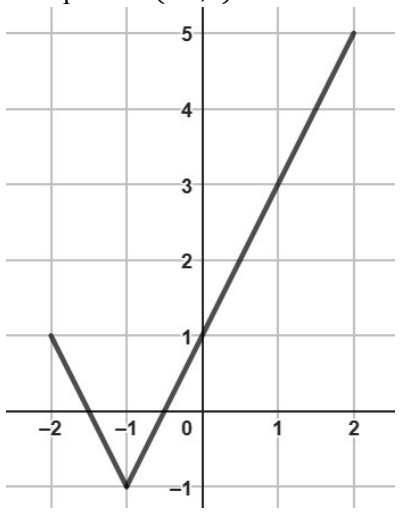
(3) The diagram shows the graph of $y = f(x)$



Draw the graph of $y = 1 + f(x - 2)$

WORKING AT B/C

(1) The diagram shows the graph of $y = h(x)$ with the minimum point at $(-1,1)$



The graph of $y = h(x)$ is translated to the graph of $y = g(x)$. The minimum point of $g(x)$ has coordinates $(2,1)$. State fully the transformation that maps $h(x)$ to $g(x)$

(2) (a) State the single transformation that maps the graph of $y = \frac{1}{x}$ to the graph of $y = \frac{1}{x-3}$
(b) **Hence** sketch the graph of $y = \frac{1}{x-3}$ showing where the curve crosses the axes and any asymptotes on the curve,

(3) The graph of $y = x^2$ to translated by the vector $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$. Write the equation of the newly translated graph in the form $y = ax^2 + bx + c$

WORKING AT A*/A

(1) $f(x) = \frac{1}{x^2}$ is translated by the vector $\begin{pmatrix} -2 \\ -1 \end{pmatrix}$ to give $g(x)$. Sketch the graph of $y = g(x)$ showing any points where the graph crosses the coordinate axes and label any asymptotes.

(2) Given that $f(x) = x(x - 1)(x + 2)$ and that $g(x) = (x - 3)(x - 4)(x - 1)$ state the single transformation that maps the graph of $y = f(x)$ to $y = g(x)$

(3) $f(x) = x^2 - 4x - 10$

The graph of $y = f(x)$ is transformed to the graph of $y = f(x) + a$. Given that there are no real solutions to the equation $f(x) + a = 0$ find the set of values of a.