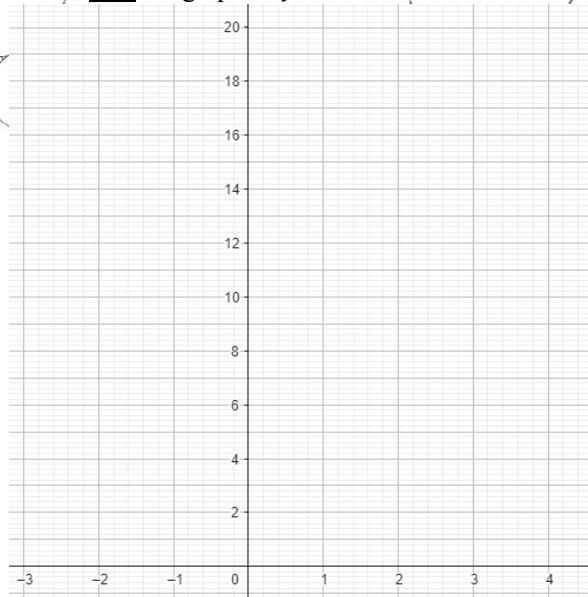# WWW.M4THS.COM
A LEVEL MATHS

(80) Basic Exponential Functions

WORKING AT D/E

(1) (a) Using a set of axes like those in the diagram below, **plot** the graph of $y = 2^x$, $-3 \leq x \leq 4$

(b) Use the graph to estimate the value of $2^{2.5}$

(2) On the same set of axes sketch the graphs of $y = 2^x$, $y = 3^x$ and $y = 4^x$ showing where the graphs cross the coordinate axes.

(3) Sketch the graph of $y = \left(\frac{1}{2}\right)^x$

WORKING AT B/C

(1) $f(x) = 2^x$

(a) **Sketch** the graph of $y = f(x)$, showing where the graph crosses the coordinate axes and writing down the equation of the horizontal asymptote.

(b) On separate diagrams, sketch the following graphs:

(i) $y = 2f(x)$ showing where the graph crosses the y axis and stating the equation of the asymptote.

(ii) $y = f(x) + 3$ showing where the graph crosses the y axis and stating the equation of the asymptote.

(iii) $y = -f(x)$ showing where the graph crosses the y axis and stating the equation of the asymptote.

(iv) $y = f(-x)$ showing where the graph crosses the y axis and stating the equation of the asymptote.

(v) $y = f(x - 1)$ stating the equation of the asymptote.

(2) The graph of $y = pa^x$ where p and a are constants passes through points $(2,18)$ and $(3,54)$

(a) Show that $18 = pa^2$ and $54 = pa^3$

(b) Use simultaneous equations to find the values of p and a.

(c) Hence, **sketch** the graph of $y = pa^x$ showing where the graph crosses the y axis and stating the equation of the asymptote.

WORKING AT A*/A

(1) **Sketch** the graph of $y = 3\left(\frac{1}{2}\right)^{x-1}$ showing where the graph crosses the y axis and stating the equation of the asymptote.

(2) The diagram below shows part of the curve with equation $y = ab^x + 2$, where a and b are constants
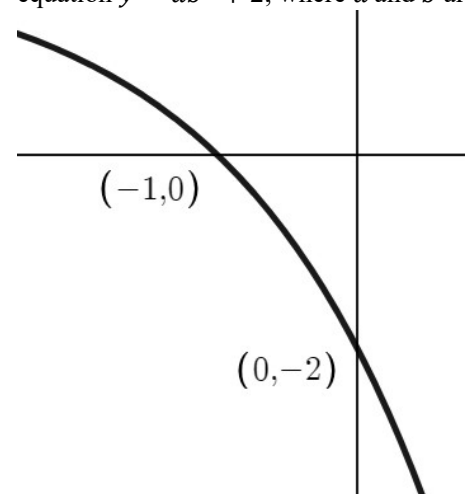
The curve passes through the point $(3, p)$. Show that $p = -30$.

(3) The graph of $y = c + ab^x$, where a, b and c are constants, crosses the y axis at the point P.
Find the coordinates of P in terms of a and c.