

**23rd December**

Factorise fully

$$(x+3)^7 + (x+3)^6(2x-1)$$

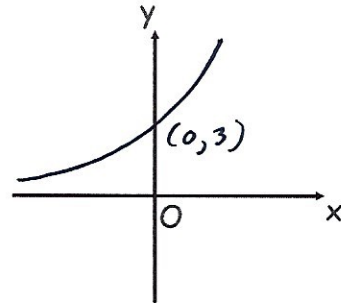
Do not attempt to expand brackets.

$$(x+3)^6 [x+3 + (2x-1)]$$

$$(x+3)^6 (3x+2)$$

Sketch the graph of $y = 3 \times 2^x$

Label the coordinates of any points of intersection with the coordinate axes.



$$A = \begin{pmatrix} 9 & -1 \\ 0 & 4 \end{pmatrix} \quad B = \begin{pmatrix} 4 & -2 \\ 1 & 3 \end{pmatrix}$$

Work out the matrix **AB**

$$AB = \begin{pmatrix} 35 & -21 \\ 4 & 12 \end{pmatrix}$$

$$f(x) = 2x^3 - 10x^2 + 30x + 2$$

Show that $f(x)$ is an increasing function for all values of x .

$$\frac{dy}{dx} = 6x^2 - 20x + 30$$

$$= 6\left(x^2 - \frac{10}{3}x\right) + 30$$

$$= 6\left[\left(x - \frac{5}{3}\right)^2 - \frac{25}{9}\right] + 30$$

$$= 6\left(x - \frac{5}{3}\right)^2 - \frac{150}{9} + 30$$

$$= 6\left(x - \frac{5}{3}\right)^2 + \frac{40}{3}$$

$$\uparrow$$

$$6\left(x - \frac{5}{3}\right)^2 \geq 0$$

$$\therefore 6\left(x - \frac{5}{3}\right)^2 + \frac{40}{3} > 0$$

QED.

$$4\sin^2 x + 7\cos^2 x \equiv A + B\sin^2 x$$

LHS

 Work out the values of A and B .

$$4\sin^2 x + 7(1 - \sin^2 x)$$

$$4\sin^2 x + 7 - 7\sin^2 x$$

$$-3\sin^2 x + 7$$

$$A = 7$$

$$B = -3$$