Name: _____ 5-a-day Further Maths

22nd February

Corbettmaths

Solve $100x^2 - 169 = 0$

$100x^2 = 169$

$x^2 = 1.69$

$x = \pm 1.3$

$2a(3x - 4) + 5(ax + 6) \equiv 77x + b$

Work out a and b

$6ax - 8a + 5ax + 30 \equiv 77x + b$

$11ax + 30 - 8a \equiv 77x + b$

$a = 7$

$30 - 8a = b$

$30 - 8 \times 7 = b$

$b = -26$

The transformation matrix **M** is

$\begin{pmatrix} 1 & a \\ -4 & 1 \end{pmatrix}$

The image of the point $(b, 3)$ under **M** is $(14, -5)$

Find a and b

$\begin{pmatrix} 1 & a \\ -4 & 1 \end{pmatrix}\begin{pmatrix} b \\ 3 \end{pmatrix} = \begin{pmatrix} 14 \\ -5 \end{pmatrix}$

$b + 3a = 14$

$-4b + 3 = -5$

$-4b = -8$ $b = 2$ $a = 4$

$a = 4$

$b = 2$

$f(x) = 2x^3 - 8x^2 + 30x + 2$

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

$f'(x) = 6x^2 - 16x + 30$

$= 6\left[x^2 - \frac{16}{6}x\right] + 30$

$8/3$

$6\left[\left(x + \frac{4}{3}\right)^2 - \frac{16}{9}\right] + 30$

$6\left(x + \frac{4}{3}\right)^2 - \frac{32}{3} + 30$

$6\left(x + \frac{4}{3}\right)^2 + \frac{58}{3} > 0$

always ≥ 0

$\therefore f(x)$ is an increasing function for all values of x

$6(x + \frac{4}{3})^2 \geq 0$

$\therefore 6(x + \frac{4}{3})^2 + \frac{58}{3} > 0$