Further Maths Daily Questions - Week 6 Monday 1

Find the invariant points of the matrix $\mathbf{A} = \begin{pmatrix} 2 & -1 \\ -2 & 3 \end{pmatrix}$

Dr Bennison Maths
MATHEMATICS EDUCATION EXPERT

Further Maths Daily Questions - Week 6 Monday 2

a) Let $\mathbf{A} = \begin{pmatrix} 3 & 4 \\ 1 & 5 \end{pmatrix}$, what is $\mathbf{A}^T$?

b) For general $n \times n$ matrices $\mathbf{A}$ and $\mathbf{B}$, prove that $(\mathbf{AB})^T = \mathbf{B}^T\mathbf{A}^T$

Further Maths Daily Questions - Week 6 Tuesday 1

Given that $z_1 = 3 + 2i$ is a root of $p(z) = z^4 - 8z^3 + 27z^2 - 38z + 26$ find the remaining roots and plot them on an Argand diagram.

Further Maths Daily Questions - Week 6 Tuesday 2

Find the mean value of the function $f(x) = x^{\frac{3}{2}}$ over the interval between $x = 1$ and $x = 3$.

Further Maths Daily Questions - Week 6 Wednesday 1

Using standard results find $\sum_{r=1}^{n} 3r^2 - 2r + 1$.

Further Maths Daily Questions - Week 6 Wednesday 2

Sketch the curve with polar equation $r = 2\sin(3\theta)$. Which family is this curve a member of?

Further Maths Daily Questions - Week 6 Thursday 1

For the matrix $\mathbf{A} = \begin{pmatrix} p & 2 \\ 0 & 1 \end{pmatrix}$ where $p \in \mathbb{R}$, prove that $\begin{pmatrix} p & 2 \\ 0 & 1 \end{pmatrix}^n = \begin{pmatrix} p^n & \dfrac{2(p-1)}{p-1} \\ 0 & 1 \end{pmatrix}$

Further Maths Daily Questions - Week 6 Thursday 2

Using a matrix method, solve the simultaneous equations $4x + 3y = 23$ and $-3x + 7y = 29$.

Further Maths Daily Questions - Week 6 Friday 1

For $z_1 = r_1\left(\cos\left(\theta_1\right) + \mathrm{i}\sin\left(\theta_1\right)\right)$ and $z_2 = r_2\left(\cos\left(\theta_2\right) + \mathrm{i}\sin\left(\theta_2\right)\right)$ prove that $\left|\frac{z_1}{z_2}\right| = \frac{|z_1|}{|z_2|}$ and that $\arg\left(\frac{z_1}{z_2}\right) = \arg(z_1) - \arg(z_2)$

Further Maths Daily Questions - Week 6 Friday 2

The equation $2x^3 - 5x^2 - 13x + 30 = 0$ has roots α, β and γ. Find the equation with roots $\alpha^2 + 1$, $\beta^2 + 1$ and $\gamma^2 + 1$.