Day 202	IGCSE 10-a-day
1 $\mathbf{v} = \begin{pmatrix} 6 \\ -6 \end{pmatrix}$. Find $\lvert\mathbf{v}\rvert$. Give your answer as a surd in its simplest form.	
2 Write $25^4 \times 12^2$ as a product of powers of prime numbers.	
3 Here are five numbers: $3x$, $3x - 2$, $x + 6$, $3x + 1$, $3x + 3$. The mean of the five numbers is 25. (a) Work out the value of x. (b) Work out the median of the five numbers.	
4 $y = \frac{6x^3 + 5x}{x}$ Find $\frac{dy}{dx}$.	
5 Use the iteration formula $x_{n+1} = \sqrt{3x_n + 10}$ with $x_0 = 4$ (Calculator) to work out x_1, x_2 and x_3. Give each answer correct to 3 decimal places.	

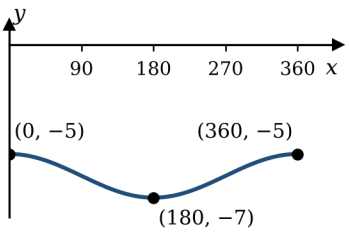
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6 $y = \frac{(x + 4)^2}{x}$ $(x \neq 0)$

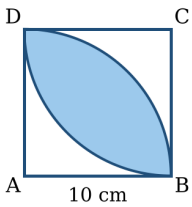
(a) Show that $\frac{dy}{dx} = \frac{(x - 4)(x + 4)}{x^2}$.

(b) Find the gradient when $x = 5$.

7 The diagram shows the graph of $y = a \cos x° + c$ for $0 \leq x \leq 360$.
Some points on the graph are labelled.
Find the value of a and the value of c.



8 ABCD is a square of side 10 cm.
BD is an arc of a circle with centre A and an arc of a circle with centre C.
Work out the area of the shaded region. Give your answer in terms of π.



9 A curve has equation $y = x^3 - x^2 - 6x + 1$.
The tangent to the curve at the point A, where $x = 0$, meets the curve again at the point B.
Find the coordinates of B.

10 $A = \begin{pmatrix} 2 & -1 \\ 4 & -3 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & -1 \\ 4 & -5 \end{pmatrix}$.
$AM = B$, where M is a 2×2 matrix.
Find M.