Day 337	IGCSE 10-a-day
1 ABCD is a parallelogram. A = (−1, 4), B = (−3, 1) and D = (−3, 0). Find the coordinates of C and of the point where the diagonals meet.	
2 A particle P moves in a straight line. After t seconds its displacement from a fixed point O is s metres, where $s = 2t^3 - 9t^2 + 8t$ $(t > 0)$ Find (a) the velocity of P, (b) the acceleration of P, when t = 2.	
3 The population of a village decreased by 5% in 2023. In 2024 the population decreased by a further 5%. Work out the overall percentage decrease over the two years.	
4 6 painters can paint a hall in 8 days. After 5 days, 5 of the painters leave. The rest carry on working at the same rate. How many more days does it take to finish?	
5 Use the iteration formula $x_{n+1} = \sqrt{2x_n + 8}$ with $x_0 = 3$ (Calculator) to work out x_1, x_2 and x_3. Give each answer correct to 3 decimal places.	

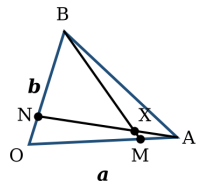
Day 337 **IGCSE 10-a-day**

6 A curve has equation $y = ax^2 + \frac{b}{x}$, where a and b are constants.
The point (1, 1) lies on the curve and the gradient of the curve at this point is 8.
Find the values of a and b.

7 A walker leaves a camp P and travels 35 km on a bearing of 285° to Q. (Calculator)
It then travels 64 km on a bearing of 220° to R.
(a) Work out the distance PR.
(b) Work out the bearing of R from P.
Give distances to 1 decimal place and the bearing to the nearest degree.

8 $\mathbf{a} = \begin{pmatrix} -4 \\ -3 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} 4 \\ 2 \end{pmatrix}$ and $\mathbf{c} = \begin{pmatrix} -8 \\ -9 \end{pmatrix}$.
$\mathbf{c} = m\mathbf{a} + n\mathbf{b}$.
Find the value of m and the value of n.

9 OAB is a triangle. OA = **a** and OB = **b**.
M is on OA with OM : MA = 3 : 1. N is on OB with ON : NB = 1 : 3. AN and BM intersect at X.
(a) Find BM in terms of **a** and **b**.
(b) Find OX in terms of **a** and **b**.
The diagram is not drawn accurately.



10 $y = 3x^4 - 24x^2 + 4$
Find the coordinates of the stationary points of the curve and determine the nature of each.