Day 138	A Level Maths: B Tier 10-a-day
1 A has position vector $\begin{pmatrix}2\\1\end{pmatrix}$ and B has position vector $\begin{pmatrix}6\\1\end{pmatrix}$. The point P lies on AB with AP : PB = 1 : 3. Find the position vector of P.	
2 $f(x) = x^3 - 5x^2 + kx$. Given that $(x - 2)$ is a factor of f(x), (a) find the value of k, (b) factorise f(x) completely.	
3 Solve $\tan x = -2$ for $0 \leq x \leq 2\pi$, giving answers to 3 significant figures.	
4 A particle moves in a straight line. At time t seconds its velocity is $v = 4t^2 - 8t + 4$ m s^{-1}. Find the distance moved between t = 1 and t = 4. (The particle does not change direction.)	
5 50 people: 18 own a cat, 30 own a dog, 6 do neither. (a) How many do both? (b) Given a person who owns a cat, find P(this person owns a dog).	

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6 A particle moves in a straight line. At time t s its velocity is $v = 25t - 2.5t^2$ m s^{-1}, for $t \geq 0$. Find the maximum speed of the particle and the time at which it occurs.	
7 Find the coordinates of the stationary point of the curve $y = \frac{e^x}{x}$, and determine its nature.	
8 R: it rains; L: Ali is late. P(R) = 0.4, P(L | R) = 0.2, P(L | R') = 0.2. (a) Find P(L). (b) Find P(R | L).	
9 Express $\frac{9x - 21}{(x - 4)(x - 1)}$ in partial fractions.	
10 The line l has equation $y = -x + 2$. The point P is $(-2, 2)$. (a) Find the line through P perpendicular to l, as $ax + by + c = 0$ with integer a, b, c. (b) Find the foot F and the exact distance PF.	