Day 245	A Level Maths: C Tier 10-a-day
1 A particle has initial velocity $(4\mathbf{i} + 5\mathbf{j})$ m s^{-1} and constant acceleration $(2\mathbf{i} + \mathbf{j})$ m s^{-2}. Find its velocity after 2 s.	
2 Seven daily rainfall readings (mm) from the Large Data Set are: 4.4, tr, 3.8, 1, 4.8, tr, 4.6. Here 'tr' means a trace, which is treated as 0. Find the mean daily rainfall to 3 s.f.	
3 Solve $x^2 + 6x - 4 = 0$, giving your answers in the form $p \pm \sqrt{q}$.	
4 Express $\frac{-5x - 11}{(x + 4)(x + 1)}$ in the form $\frac{A}{x + 4} + \frac{B}{x + 1}$. Find the values of A and B.	
5 Three forces $(-5\mathbf{i} - \mathbf{j})$ N, $(p\mathbf{i} + q\mathbf{j})$ N and $(8\mathbf{i} - 4\mathbf{j})$ N act on a particle which is in equilibrium. $\mathbf{i}$ and $\mathbf{j}$ are perpendicular unit vectors. Find the values of p and q.	

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6 $(x - 3)$ is a factor of $x^3 + kx^2 - 4x - 42$. Find the value of k.	
7 $f(x) = 8 \sin x + 15 \cos x + 6$. Write f(x) in the form $R \sin(x + \alpha) + 6$, with α in degrees to 1 d.p., and state the maximum value of f(x).	
8 The probability that a patient takes the drug is 0.5. If so, the probability that the patient recovers is 0.5; otherwise it is 0.2. Given that the patient recovers, find the probability that a patient takes the drug.	
9 Solve $\tan 2x = \sqrt{3}$ for $0° \leq x \leq 180°$.	
10 The diagram shows a circle with the centre marked. The circle touches the x-axis. Find the equation of the circle. 	