Day 66	A Level Maths: B Tier 10-a-day
1 A ball is dropped from rest from a window, 19.6 m above the ground. Take g = 9.8 m s^{-2}. Find (a) the time taken to reach the ground, (b) its speed on landing.	
2 The points A, B and C are (−6, −2), (−2, −1) and (−3, 3). (a) Show that angle ABC = 90°. (b) Find the area of triangle ABC.	
3 Given that $\tan\theta = \frac{2}{3}$ and θ is acute, find the exact value of sec θ.	
4 Two forces ($\mathbf{i} - 4\mathbf{j}$) N and ($-4\mathbf{i} + 8\mathbf{j}$) N act on a particle of mass 2 kg. Find the magnitude of the acceleration of the particle.	
5 $f(x) = 2x^3 + px^2 + qx + 6$. When f(x) is divided by (x + 3) the remainder is −54, and when divided by (x − 1) the remainder is 2. Find p and q.	

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6 Solve $\cos 2x = \sin x$ for $0 \leq x \leq 360°$, giving answers to 1 d.p. where necessary.	
7 Packet masses are normal, s.d. 5 g. Claimed mean 200 g; 16 packets have mean 201.9 g. Test at the 5% level whether the true mean is greater than 200.	
8 Line l_1: $\mathbf{r} = \begin{pmatrix} -3 \\ 1 \\ 3 \end{pmatrix} + \lambda \begin{pmatrix} 3 \\ 0 \\ 3 \end{pmatrix}$. Line l_2: $\mathbf{r} = \begin{pmatrix} 0 \\ 0 \\ 3 \end{pmatrix} + \mu \begin{pmatrix} 3 \\ -1 \\ 0 \end{pmatrix}$. Show that l_1 and l_2 intersect and find the point.	
9 Customers arrive at a shop at random at an average rate of 4 per hour. Find the probability that in 30 minutes there are exactly 2 (3 s.f.).	
10 A curve has parametric equations $x = 3t + 1$, $y = t^2 + t - 3$. The line $y = 2x - 9$ meets the curve at two points. Find the coordinates of these points.	