Day 354	A Level Maths: B Tier 10-a-day
1 Given that $y = \cos 4x$, find $\frac{dy}{dx}$, and the gradient of the curve when $x = \frac{\pi}{12}$.	
2 The length X cm of a metal rod is normal with mean 30, s.d. 3. Find, to 3 s.f., the probability a value is (a) more than 34.5, (b) between 34.5 and 39.	
3 Evaluate $(\frac{81}{16})^{\frac{1}{4}}$.	
4 Find the exact value of $\int_1^2 (2e^{3x} + \frac{5}{x})\, dx$.	
5 Find the quotient and the remainder when $2x^3 - x^2 + 2x + 9$ is divided by $(x + 1)$.	

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6 Simplify $\frac{\cos 2x}{\cos x + \sin x}$, giving your answer in its simplest form.	
7 Particles A (9 kg) and B (11 kg) are joined by a light string over a smooth pulley. Both are held with the string taut, B is 2.25 m above the ground, then released. Take g = 9.8 m s^{-2}. Find the speed with which B hits the ground.	
8 Packet masses are normal, s.d. 8 g. Claimed mean 200 g; 16 packets have mean 205.1 g. Test at the 5% level whether the true mean is greater than 200.	
9 A stone is projected from level ground with horizontal velocity component 23 m s^{-1} and vertical velocity component 44.1 m s^{-1} upwards. Take g = 9.8 m s^{-2}. Find (a) the time of flight, (b) the horizontal range.	
10 f(x) = 3x + 4 for $-3 < x \leq 2$. Find the range of f.	