Day 63	A Level Maths: B Tier 10-a-day
1 A block of mass 5 kg is projected along a rough horizontal surface with speed 2.8 m s^{-1} and comes to rest after sliding 4 m. Take g = 9.8 m s^{-2}. Use work and energy to find the coefficient of friction.	
2 Values of y = f(x) are shown. x: 1, 2, 3, 4, 5, 6 y: 2.9, 2.5, 2.1, 1.1, 2.7, 3 Estimate $\int_1^6 f(x)\,dx$ using the trapezium rule.	
3 A particle is in equilibrium under three forces: P N at angle θ above the positive x-axis, a force of 5 N in the negative x-direction and a force of Q N in the negative y-direction. $\cos\theta = \frac{5}{13}$. Find P and Q.	
4 Prove that if n is odd then $n^2 + 9n + 5$ is odd.	
5 The curve C has equation $y = 2x + \ln(2x^2 - 1)$. Find the equation of the tangent to C at the point where x = 1, in the form y = mx + c.	

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6 Line l_1 has equation $7x - 2y = -7$ and line l_2 has equation $7x + 6y = 49$. The lines meet at P. Find the area of the triangle formed by l_1, l_2 and the x-axis.	
7 Solve $\sin 2x = \cos x$ for $0 \leq x \leq 360°$, giving answers to 1 d.p. where necessary.	
8 Express $\frac{2x^2 - 4x - 18}{(x + 3)(x - 3)}$ in the form $P + \frac{Q}{(x + 3)} + \frac{R}{(x - 3)}$.	
9 Meteors are seen at random at an average rate of 1.5 per hour. Find the probability that in 30 minutes there are at least 3 (3 s.f.).	
10 The scores on a test are normally distributed. $P(X < 35) = 0.1587$ and $P(X > 45) = 0.1587$. Find the mean and standard deviation (3 s.f.).	