Day 18	A Level Maths: B Tier 10-a-day
1 Ordered data, texts sent in a day by 11 students: 12, 12, 16, 18, 18, 21, 25, 28, 28, 30, 34. Find Q_1, Q_3, the IQR and any outliers (more than 1.5 × IQR beyond a quartile).	
2 (a) Expand $(9 - x)^{-\frac{3}{2}}$ in ascending powers of x up to and including the term in x^3. (b) State the range of values of x for which the expansion is valid.	
3 Solve $\tan x = -3$ for $0 \leq x \leq 2\pi$, giving answers to 3 significant figures.	
4 Describe the single transformation that maps the graph of y = f(x) onto the graph of: (a) $y = -f(x)$ (b) $y = f(3x)$	
5 (a) Write $\frac{-2x - 9}{(x + 4)(x + 5)}$ in partial fractions. (b) Hence evaluate $\int_0^4 \frac{-2x - 9}{(x + 4)(x + 5)}\,dx$, giving the answer as a single logarithm.	

Day 18	A Level Maths: B Tier 10-a-day
6 A uniform rod AB of length 6 m and mass 4 kg hangs horizontally from two vertical strings attached 0.5 m from A and 0.5 m from B. A particle of mass 1 kg is attached 2 m from A. Take g = 9.8 m s^{-2}. Find the tension in each string.	
7 Packet masses are normal, s.d. 5 g. Claimed mean 200 g; 50 packets have mean 201.8 g. Test at the 5% level whether the true mean is greater than 200.	
8 The mass M kg of a substance satisfies $\frac{dM}{dt} = -0.15M$, where t is in years. Initially M = 60. Find M when t = 10, and the half-life, each to 3 s.f.	
9 Solve the equation $2^{2x} - 1 = 0$.	
10 A particle of mass 6 kg is suspended in equilibrium by two light strings attached to a horizontal ceiling. The strings make angles α and β with the ceiling, where $\tan\alpha = \frac{5}{12}$ and $\tan\beta = \frac{3}{4}$. Take g = 9.8 m s^{-2}. Find the tension in each string.	