Day 258	A Level Maths: B Tier 10-a-day
1 A school has 64 students in Year 7, 20 in Year 8 and 36 in Year 9. A stratified sample of size 30 is taken. Find the number selected from each group.	
2 A block of mass 6 kg is released from rest on a rough plane inclined at angle α to the horizontal, where $\tan\alpha = \frac{5}{12}$. The coefficient of friction is 0.2. Take $g = 9.8$ m s^{-2}. Find the acceleration down the plane, and the distance moved in 3 s.	
3 Simplify $\frac{(2x)^3 \times x^3}{4x^3}$.	
4 A particle moves so that its position vector relative to O at time t s is $\mathbf{r} = (2t^2 + t)\mathbf{i} + (3t^3 + 3t)\mathbf{j}$ metres. Find the velocity when $t = 1$, and the speed at that time.	
5 Express $\frac{-3 + 4\sqrt{3}}{2 - \sqrt{3}}$ in the form $p + q\sqrt{3}$, where p and q are integers.	

Day 258	A Level Maths: B Tier 10-a-day
6 A summary of the times, t minutes, taken by 10 people to complete a puzzle gives $\Sigma t = 277$ and $\Sigma t^2 = 8881$. Find the mean and the standard deviation (3 s.f.).	
7 Simplify $\frac{1 - \cos 6x}{2 \sin 3x}$, giving your answer as a single trigonometric term.	
8 Express $\frac{-5x^2 - 26x - 17}{(x - 1)(x + 3)^2}$ in partial fractions.	
9 The variables x and y satisfy $y = ab^x$. A graph of ln y against x is a straight line with gradient ln 4 that passes through (0, ln 6). Find the values of a and b.	
10 Find the exact value of $\int_0^{\frac{\pi}{12}} \tan^2 3x \, dx$.	