Day 311	A Level Maths: S Tier 10-a-day
1 Solve $\sin(3\theta - 30°) = -\frac{\sqrt{3}}{2}$ for $0° \leq \theta \leq 360°$.	
2 20 recorded times (seconds) have mean 34 and standard deviation 8. One value was recorded as 41 but should have been 59. Find the correct mean and the correct standard deviation.	
3 Solve $2^{2x} - 24 \times 2^{x} + 128 = 0$, giving each answer exactly and, where not an integer, to 3 s.f.	
4 Express $\frac{-2x^2 + 24x - 67}{(x-1)(x-4)^2}$ in the form $\frac{A}{(x-1)} + \frac{B}{(x-4)} + \frac{C}{(x-4)^2}$.	
5 For 20 observations x, $\Sigma(x - 50) = 90$ and $\Sigma(x - 50)^2 = 805$. (a) Find the mean of x. (b) Find the standard deviation of x. (c) Find the value of Σx^2.	

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6 A train accelerates uniformly from rest at 0.75 m s^{-2} to a speed of V m s^{-1}, travels at this speed, then decelerates uniformly at 1.25 m s^{-2} to rest. The journey takes 73 s and covers 855 m. Find V and the time spent at constant speed.	
7 The function f is defined by $f(x) = 2x^2 - 4x - 2$ for $x \geq k$. Given that k is the least value for which f is one-one, find k, $f^{-1}(x)$, and the domain of f^{-1}.	
8 A river is 120 m wide and flows at 6 m s^{-1}. A boatman can row at 10 m s^{-1} in still water and wants to reach the point directly opposite his starting point. Find (a) the angle to the bank at which he should head, to 1 d.p., (b) the time taken, to 3 s.f.	
9 Find the exact coordinates of the stationary point of $y = 4x^3 \ln x$ for $x > 0$, and determine its nature.	
10 A(−15, 5) and B(−3, −13). The point C lies on the x-axis and CA = CB. Find the coordinates of C and the area of triangle ABC.	