Day 322 **A Level Maths: A Tier 10-a-day**

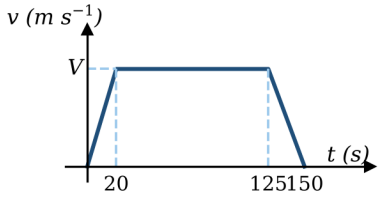
1 The table summarises the journey time, t minutes of 53 items.
Use linear interpolation to estimate the lower quartile.

Class	Frequency
$0 \le t < 10$	12
$10 \le t < 20$	3
$20 \le t < 30$	9
$30 \le t < 40$	17
$40 \le t < 50$	12

2 $f(x) = x^2 - 10x + 17$.
(a) Write f(x) in the form $a(x + p)^2 + q$.
(b) State the minimum value of f(x) and the value of x at which it occurs.
(c) Solve f(x) = 0, giving surds in simplest form.

3 Solve $5^{3x+3} = 2^{2x-1}$.
Give your answer to 3 significant figures.

4 The diagram shows the speed-time graph for a train journey of 3570 m. Find (a) V, (b) the deceleration in the final stage.



5 Of 33 students, 16 study Maths (M), 14 Physics (P) and 17 Chemistry (C).
6 study M and P, 6 study M and C, 8 study P and C, and 4 study all three.
One student is chosen at random. Given that a student studies exactly two subjects, find the probability that they study Physics.

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6 A is acute and B is obtuse, with $\sin A = \frac{24}{25}$ and $\cos B = -\frac{5}{13}$. Find the exact values of $\cos(A-B)$ and $\sin(A-B)$.	
7 A sequence is defined by $u_1 = \frac{3}{2}$ and $u_{n+1} = \frac{1}{1-u_n}$. (a) Find u_2 and u_3. (b) Find u_{100} and $\sum_{r=1}^{100} u_r$.	
8 A 2 kg particle rests on a rough plane inclined at α, $\tan\alpha = \frac{4}{3}$, $\mu = 0.5$. A force of P N acts up a line of greatest slope and the particle stays at rest. Find the range of values of P. Take g = 9.8.	
9 Find the exact value of $\sin(\arcsin\frac{3}{5} + \arcsin\frac{5}{13})$.	
10 Solve $x(\sqrt{5}-2) = 4 + 2\sqrt{5}$, writing x in the form $p + q\sqrt{5}$.	