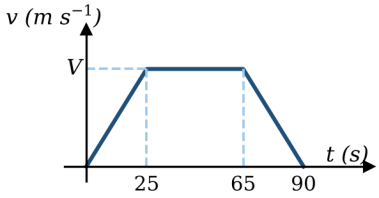
Day 318	A Level Maths: A Tier 10-a-day

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

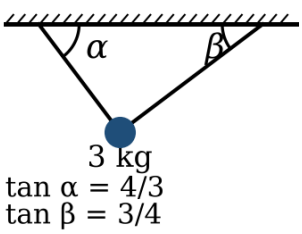
2 A curve has parametric equations $x = t + 3$, $y = t^2$.
Find a Cartesian equation of the curve.

3 The diagram shows the speed-time graph for a train journey of 1820 m. Find (a) V, (b) the deceleration in the final stage.



4 A circle has equation $x^2 + y^2 - 8x + 6y + 15 = 0$.
(a) Find the centre and radius of the circle.
(b) Determine whether P(6, −3) lies inside or outside the circle.

5 $|a| = 6$, $|b| = 4$ and the angle between a and b is 60°.
Find the exact values of $a \cdot b$ and $|a + b|$.

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6 X is normally distributed with mean μ and standard deviation 12. Given that P(X > 77) = 0.3085, find μ to 3 significant figures.	
7 A circular ripple has area A cm^2 increasing at a constant 3 cm^2s^{-1}. Find the rate at which the circumference is increasing when the radius is 2 cm.	
8 Of 36 students, 19 study Maths (M), 22 Physics (P) and 15 Chemistry (C). 10 study M and P, 8 study M and C, 9 study P and C, and 4 study all three. One student is chosen at random. Given that a student studies Chemistry, find the probability that they study all three.	
9 A sequence is defined by $u_1 = 3$ and $u_{n+1} = \frac{1}{1 - u_n}$. (a) Find u_2 and u_3. (b) Find u_{50} and $\sum_{r=1}^{50} u_r$.	
10 A 3 kg particle hangs in equilibrium from two light strings, as shown. Find the tension in each string (T_1 in the string at angle α). Take g = 9.8.  $\tan\alpha = 4/3$ $\tan\beta = 3/4$	