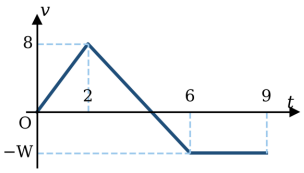
Day 145	A Level Maths: S Tier 10-a-day
1 For n = 15 pairs of values: $\Sigma x = 150$, $\Sigma y = 225$, $\Sigma x^2 = 1643$, $\Sigma xy = 1964$. (a) Find the equation of the regression line of y on x. (b) The x values lie between 6 and 15. Estimate y when x = 18 and comment on its reliability.	
2 The diagram shows the velocity-time graph of a particle P moving on a straight line (velocity in m s^{-1}, time in s). At time 9 s, P is back at its starting point. Find (a) the value of W, (b) the greatest distance of P from its starting point. 	
3 Solve $-x^4 + 20x^2 - 64 \geq 0$.	
4 A particle P moves with constant acceleration. At t = 0 seconds P is at $(-\mathbf{i} + \mathbf{j})$ m with velocity $(10\mathbf{i} + 13\mathbf{j})$ m s^{-1}. At t = 10, P has velocity $(-10\mathbf{i} - 7\mathbf{j})$ m s^{-1}. Find (a) the acceleration of P, (b) the time at which P moves parallel to $(\mathbf{j})$, (c) the position vector of P at that time.	
5 A drink cools according to $\theta = 18 + Ae^{-kt}$, where θ °C is the temperature after t minutes. Initially $\theta = 100$, and after 8 minutes $\theta = 59$. Find A and k, then find when $\theta = 36$ (3 s.f.).	

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6 Data pairs (x, y) are coded by $u = x - 7$ and $v = \frac{y}{10}$. The regression line of v on u is $v = 37 + 1u$. (a) Find the regression line of y on x in the form $y = a + bx$. (b) Use it to estimate y when $x = 15$.	
7 For $0 \leq x \leq \pi$, the curves $y = 6 \sin x$ and $y = 6 \sin 2x$ meet at the origin and at $x = \frac{\pi}{3}$. Find the exact area enclosed between them for $0 \leq x \leq \frac{\pi}{3}$.	
8 $u_{n+1} = \frac{1}{2}u_n + 6$, $u_1 = -6$. (a) Find the limit L of the sequence. (b) Find the least n such that $\lvert u_n - L \rvert < 0.001$.	
9 The curve C has equation $x^2 - 2xy + 4y^2 = 48$. Find the coordinates of the points on C where the tangent is parallel to the x-axis.	
10 Each year Jo pays £300 into an account on 1 January. Interest of 6% is added each 31 December. Find the first year-end at which the balance exceeds £12,000.	