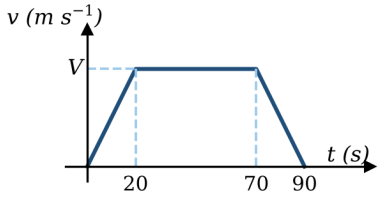
Day 349	A Level Maths: A Tier 10-a-day
1 Solve $\sin 2\theta = -\sin\theta$ for $0° \leq \theta \leq 360°$.	
2 The diagram shows the speed-time graph for a train journey of 1750 m. Find (a) V, (b) the deceleration in the final stage. 	
3 A(−10, −8) and B(6, 4) are the ends of a diameter of a circle. (a) Find the equation of the circle, in the form $x^2 + y^2 + ax + by + c = 0$. (b) Show that C(4, −10) lies on the circle.	
4 Flaws occur in a metre of cable at a mean rate of 1.5 per metre, as a Poisson process. Find the probability that in one such period there are (a) exactly 4 (b) at least 4 (c) fewer than 4 (3 s.f.).	
5 Expand $(8 + x)^{\frac{1}{3}}$ in ascending powers of x, up to and including x^2. State the range of x for which the expansion is valid.	

Day 349	A Level Maths: A Tier 10-a-day
6 For 40 values of x, the coded variable $y = \frac{x - 50}{4}$ gives $\Sigma y = 40$ and $\Sigma y^2 = 290$. Find the mean and standard deviation of x.	
7 A hemispherical bowl of radius 8 cm is filled at 20 $cm^3 s^{-1}$. When the depth is h, $V = \pi(8h^2 - \frac{1}{3}h^3)$. Find $\frac{dh}{dt}$ when h = 3 cm.	
8 A particle slides from rest down a rough plane inclined at α to the horizontal, where $\tan \alpha = \frac{5}{12}$. It moves 8.82 m in 3 s. Find (a) the coefficient of friction, (b) the speed after 3 s. Take g = 9.8.	
9 The line through the origin is a tangent to the curve $y = x^2 + 5$. Find the gradients of the two possible tangents and the points of contact.	
10 $f(x) = \frac{5x - 3}{(1 - x)(1 - 3x)}$. (a) Express f(x) in partial fractions. (b) Hence expand f(x) up to x^2. (c) State the range of x for which the expansion is valid.	