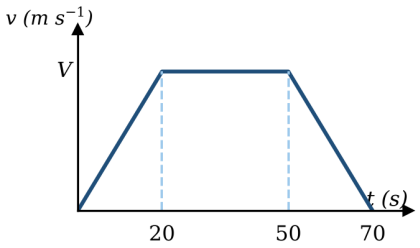
Day 31	A Level Maths: B Tier 10-a-day
1 The circle C has equation $(x - 2)^2 + (y + 4)^2 = 13$. The point P(0, −7) lies on C. Find an equation of the tangent to C at P, in the form ax + by + c = 0 with integer a, b, c.	
2 Solve $\tan x = -4$ for $0 \leq x \leq 2\pi$, giving answers to 3 significant figures.	
3 30 pairs of rainfall and crop yield give r = −0.217. One-tailed critical value (5%): 0.3061. Test for negative correlation.	
4 Given that $\sum_{r=1}^{n}(4r - 3) = 231$, find the value of n.	
5 P(X = x) = k(x + 2) for x = 1, 2, ..., 3. (a) Find k. (b) Find E(X) and Var(X).	

Day 31 **A Level Maths: B Tier 10-a-day**

6 A lift travels between floors in 70 s. The speed-time graph is a trapezium, with the maximum speed V m s^{-1} held from t = 20 to t = 50.
The floors are 400 m apart. Find V, and the deceleration in the final stage.



7 Solve $2\cos^2 x - \sin x - 2 = 0$ for $0 \leq x \leq 360°$, giving answers to 1 d.p. where necessary.

8 A javelin is projected from level ground with horizontal velocity component 23 m s^{-1} and vertical velocity component 44.1 m s^{-1} upwards.
Take g = 9.8 m s^{-2}.
Find (a) the time of flight, (b) the horizontal range.

9 (a) Expand $(1 - x)^{-2}$ up to the x^2 term.
(b) Use x = 0.04 to estimate $\frac{1}{0.96^2}$ to 5 decimal places.

10 A has position vector $\begin{pmatrix} -4 \\ 1 \end{pmatrix}$ and B has position vector $\begin{pmatrix} -4 \\ -5 \end{pmatrix}$.
The point P lies on AB with AP : PB = 2 : 1.
Find the position vector of P.