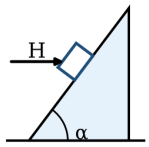
Day 186	A Level Maths: S Tier 10-a-day
1 For events A and B, P(A) = 0.8, P(B) = 0.45 and P(A | B) = 0.85. (a) Find P(A ∩ B). (b) Find P(A | B′).	
2 A population of bacteria is modelled by $P = P_0e^{kt}$, t in hours. Initially P = 120 and after 6 hours P = 150. Find k, and the time for the population to reach 360, to 3 s.f.	
3 The curve C has equation $y = \frac{3x - 15}{x - 2}$. (a) Write down the equations of the asymptotes of C. (b) The line y = x + k is a tangent to C. Find the possible values of k.	
4 (a) Express 6 cos θ + 8 sin θ in the form R cos(θ − α), where R > 0 and 0 < α < 90°. Give α to 1 d.p. (b) Hence solve 6 cos θ + 8 sin θ = −1 for 0 ≤ θ < 360°, giving answers to 1 d.p.	
5 Particles A and B are projected from a point O at the same instant, with initial velocities (5**i** + 24**j**) m s^{-1} and (8**i** + 20**j**) m s^{-1} respectively (i horizontal, j vertically upwards). Both are still in flight after 2 s. Find (a) the distance AB at this time, (b) the angle AB makes with the horizontal, to 1 d.p.	

Day 186	A Level Maths: S Tier 10-a-day

6 For 25 pairs of values, $S_{xx} = 36$, $S_{yy} = 576$ and $S_{xy} = 92$.
(a) Calculate the product moment correlation coefficient r.
(b) The critical value for a one-tailed test at the 1% level with n = 25 is 0.4622. Carry out the test of H_0: $\rho = 0$ against H_1: $\rho > 0$.

7 The first row of a theatre has 14 seats. Each row has 3 more seats than the row in front. Find
(a) the number of seats in row 46,
(b) the least number of rows for at least 1219 seats.

8 A particle of weight 140 N rests on a rough plane inclined at α to the horizontal, where $\tan\alpha = \frac{4}{3}$ and $\mu = 0.5$.
A horizontal force H N, in the vertical plane through a line of greatest slope, holds it in equilibrium. Find the range of possible values of H.



9 The curve C has equation $x^2 + xy + y^2 = 27$. Find the coordinates of the points on C where the
tangent is parallel to the x-axis.

10 A(−10, 12) and B(−5, −13). The point C lies on the x-axis and CA = CB. Find the coordinates of C and the area of triangle ABC.