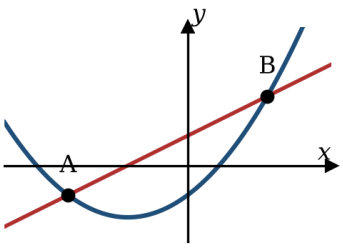
Day 355	A Level Maths: A Tier 10-a-day
1 A ball is projected from a point O on horizontal ground at angle α above the horizontal, $\tan\alpha = \frac{12}{5}$, and passes through A, 20 m horizontally from O and 31.1 m above the ground. Find the speed of projection. Take g = 9.8.	
2 Summary statistics for the daily mean windspeed (knots) in the same month are: Heathrow: mean 15.5, standard deviation 1.3; Leuchars: mean 15, standard deviation 3.6. Make two comparisons.	
3 A stone is projected vertically upwards from the ground. It passes a ledge 2 s after projection and again 5 s after projection. Find (a) the speed of projection, (b) the height of the ledge, (c) the greatest height. Take g = 9.8.	
4 Express $\frac{-15x - 30}{(2x + 3)(x + 3)}$ in partial fractions.	
5 Use the substitution $u = x^2$ to find the exact value of $\int_0^2 x\, e^{2x^2}\, dx$.	

Day 355	A Level Maths: A Tier 10-a-day
6 Find the coefficient of x^3 in the expansion of $(2 + 3x)(2 - 2x)^8$.	
7 Use integration by parts to find the exact value of $\int_1^e x \ln x \, dx$.	
8 1% of people have a disease. The screening test is positive for 98% of those who have it and for 1% of those who do not. (a) Find the probability that a person tests positive. (b) Given a positive test, find the probability that the person has the disease (3 s.f.).	
9 The diagram shows the curve $y = x^2 + 3x - 3$ and the line $y = 2x + 3$, meeting at A and B. (a) Find the coordinates of A and B. (b) Find the coordinates of the midpoint of AB. 	
10 The tangent to the curve $y = \ln(4x)$ at the point P passes through the origin. Find the exact coordinates of P and the equation of the tangent.	