Day 185	A Level Maths: C Tier 10-a-day
1 A horizontal force of 45 N acts on a sledge of mass 10 kg on a smooth horizontal surface. Find the acceleration.	
2 A is $(-4, 5)$ and B is $(2, -1)$. Find (a) the midpoint of AB, (b) the length of AB, as a surd in simplest form.	
3 $f(x) = e^x - 3x - 2$. Show that $f(x) = 0$ has a root between $x = 2$ and $x = 3$.	
4 X is the number of heads when a fair coin is tossed 7 times. Can X be modelled by a binomial distribution? Give a reason.	
5 A circle has equation $(x + 3)^2 + (y + 4)^2 = 25$. Determine whether the point $P(6, -2)$ is inside, outside or on the circle.	

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6 $X \sim B(30, p)$. H_0: $p = 0.2$, H_1: $p < 0.2$. Find the critical region for a test at the 10% significance level.	
7 A car starts from rest and accelerates uniformly at 0.5 m s^{-2} for 8 s, then travels at constant speed for a further 20 s. Find the total distance travelled.	
8 Use integration by parts to find $\int x \cos 5x \, dx$.	
9 The line $y = -4x + k$ is a tangent to the curve $y = x^2 - 10x + 5$. Find the value of k.	
10 A(0, −2), B(4, −4) and C(10, k). Given that A, B and C are collinear, find k.	