Day 59	A Level Maths: B Tier 10-a-day

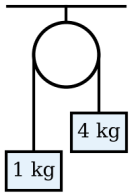
1 A particle moves in a straight line. At time t seconds its velocity is $v = 3t^2 - 4t + 3$ m s^{-1}. Find the distance moved between t = 0 and t = 4. (The particle does not change direction.)

2 A circle has equation $x^2 + y^2 - 4x - 2y - 27 = 0$.
Find the coordinates of its centre and its radius.

3 Given that $y = \frac{x^2 + 3}{x + 2}$,
find $\frac{dy}{dx}$, and its value when x = 1.

4 A curve has equation $y = \frac{-3}{x - 2} + 3$.
(a) Write down the asymptotes.
(b) Find where the curve crosses the axes.

5 Particles of mass 1 kg and 4 kg hang on a light string over a smooth fixed pulley, as shown, and are released from rest. Take g = 9.8 m s^{-2}. Find the acceleration and the tension in the string.



Day 59	A Level Maths: B Tier 10-a-day
6 Solve $2\sin^2 x - \cos x - 2 = 0$ for $0 \leq x \leq 360°$, giving answers to 1 d.p. where necessary.	
7 X ~ Po(4.5), modelling the number of flaws per metre of cloth. Find, to 3 significant figures, (a) P(X = 6) (b) P(X ≤ 6)	
8 Solve $\sin 2x = 5\cos x$ for $0 \leq x \leq 360°$, giving answers to 1 d.p. where necessary.	
9 The points A and B have coordinates (−4, 8) and (−5, 1). (a) Find the midpoint of AB. (b) Find the line AB as ax + by + c = 0, with integer a, b, c.	
10 Customers arrive at a shop at random at an average rate of 3 per hour. Find the probability that in 30 minutes there are exactly 2 (3 s.f.).	