Day 27	A Level Maths: C Tier 10-a-day

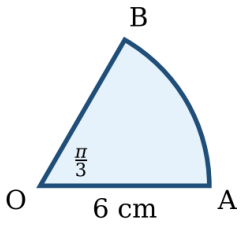
1 A line has equation $\mathbf{r} = \begin{pmatrix} 1 \\ -3 \\ 4 \end{pmatrix} + t\begin{pmatrix} -1 \\ 1 \\ 3 \end{pmatrix}$.

Write down a vector equation of the line through the origin, parallel to this line.

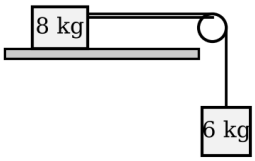
2 The line $y = \frac{5}{2}x + 3$ is perpendicular to the line $y = kx - 5$. Find the value of k.

3 For 7 data pairs, with temperature (°C) from 10 to 18, the regression line is $S = 20 + 2T$. Estimate ice cream sales when $T = 8$ and comment on the reliability.

4 The diagram shows sector OAB of a circle. Find, in terms of π, (a) the arc length AB, (b) the area of the sector.



5 Find the sum of the first 7 terms of the geometric series $2 + 4 + 8 + ...$

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6 A curve has equation $xy = 6$. Find dy/dx in terms of x and y, and hence the gradient at (2, 3).	
7 A 8 kg particle on a smooth horizontal table is joined by a light string over a smooth pulley to a hanging 6 kg particle, as shown. The system is released from rest. Take $g = 9.8$ m s^{-2}. Find the tension. 	
8 A is $(-4, 4)$ and B is $(-8, -2)$. Find the equation of the perpendicular bisector of AB, in the form $ax + by = c$ with integer a, b and c.	
9 A train travelling at 12 m s^{-1} brakes uniformly and comes to rest after travelling 48 m. (a) Find the deceleration. (b) Find the time taken to stop.	
10 $X \sim B(200, 0.3)$. Use a normal approximation to find $P(X \leq 63)$, to 3 s.f.	