Day 29 **A Level Maths: B Tier 10-a-day**

1 A lift of mass 200 kg is raised and lowered by a vertical cable. The lift accelerates upwards at 1.5 m s^{-2}.
Take g = 9.8 m s^{-2}.
Find the tension in the cable.

2 The table shows the number of siblings, x, of 53 students.
Calculate the mean and standard deviation (3 s.f.).

x	0	1	2	3	4	5
Frequency	11	6	12	2	11	11

3 Evaluate $(\frac{16}{81})^{\frac{1}{4}}$.

4 Given that $\tan\theta = \frac{1}{2}$ and θ is acute,
find the exact value of cosec θ.

5 A circle has equation $x^2 + y^2 + 6x + 6y + 5 = 0$.
Find the coordinates of its centre and its radius.

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6 Find the coordinates of the stationary point of the curve $y = x^2 \ln x$, and determine its nature.	
7 Find the coefficient of x^2 in the expansion of $(1 + 4x)(1 + x)^5$.	
8 A car of mass 2000 kg moves along a straight horizontal road. The engine produces a driving force of 2400 N and the resistance to motion is 800 N. Find the acceleration of the car.	
9 A coin is thought to land heads with probability 0.4. It is tossed 40 times and lands heads 11 times. Test, at the 5% significance level, whether the probability of heads is different from 0.4.	
10 Use the substitution $u = e^x + 3$ to find the exact value of $\int_0^{\ln 2} (e^x + 3)^3 e^x \, dx$.	