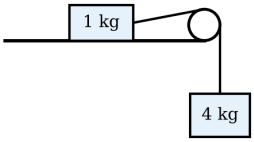
Day 113	A Level Maths: B Tier 10-a-day

1 A particle of mass 1 kg lies on a smooth horizontal table. It is attached by a light string over a smooth pulley at the edge of the table to a particle of mass 4 kg hanging freely.
Take $g = 9.8\ \text{m s}^{-2}$.
The system is released from rest. Find the acceleration and the tension in the string.



2 Solve $\cos 3x = -0.3$ for $0 \leq x \leq 360°$, giving answers to 1 d.p.

3 Express $\dfrac{4-\sqrt{2}}{\sqrt{2}}$ in the form $p + q\sqrt{2}$, where p and q are integers.

4 A player says she scores with probability 0.5. In 30 shots she scores 13 times.
Test, at the 5% level, whether the true proportion is lower than claimed.

5 Solve $e^{2x} - 13\,e^{x} + 40 = 0$,
giving your answers as exact values.

Day 113	A Level Maths: B Tier 10-a-day
6 Solve the simultaneous equations $2x + y = -15$ $x^2 + y^2 = 225$	
7 A javelin is projected from level ground with horizontal velocity component 14 m s^{-1} and vertical velocity component 24.5 m s^{-1} upwards. Take g = 9.8 m s^{-2}. Find (a) the time of flight, (b) the horizontal range.	
8 X ~ B(80, 0.6). Use a normal approximation to find P(X ≥ 49), to 3 significant figures.	
9 A sequence is defined by $u_{n+1} = \frac{1}{2}u_n + \frac{3}{2}$, $u_1 = 16$. (a) Find u_2. (b) Given that the sequence converges to a limit L, find L.	
10 Find the coordinates of the stationary point of the curve $y = 3x - \ln x$, and determine its nature.	