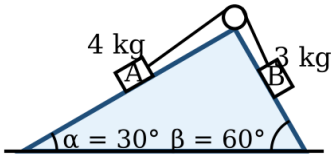
Day 205	A Level Maths: A Tier 10-a-day
1 Show by counter-example that the statement "$n^2 + n + 7$ is prime for all positive integers n" is false.	
2 Solve $\cos 2x + 7\cos x = -4$ for $0° \leq x \leq 360°$.	
3 The system is released from rest. Find (a) the magnitude of the acceleration and which particle moves down, (b) the tension. Take g = 9.8. Give answers to 3 s.f. if not exact. 	
4 Expand $(1 + 2x)^{-\frac{3}{2}}$ in ascending powers of x up to and including the term in x^3. State the range of values of x for which the expansion is valid.	
5 Solve the differential equation $y\frac{dy}{dx} = 4x$, given that y = 2 when x = 0 (y > 0). Give y in terms of x.	

Day 205	A Level Maths: A Tier 10-a-day
6 X ~ B(80, 0.4). Use a normal approximation to estimate P(X ≥ 36) to 3 significant figures.	
7 A 8 kg box is pulled from rest along rough horizontal ground by a horizontal force of 25.12 N and moves 1.6 m in 4 s. Find (a) the coefficient of friction. The force is then removed; (b) find the further distance moved. Take g = 9.8. Give answers to 3 s.f. if not exact.	
8 Solve $4\text{cosec}^2\theta + 14\cot\theta + 2 = 0$ for $-180° < \theta < 180°$, $\theta \neq 0$. Give answers to 1 d.p.	
9 $f(x) = \frac{14x + 2}{(1 - 3x)(1 + x)}$. (a) Express f(x) in partial fractions. (b) Hence expand f(x) up to x^2. (c) State the range of x for which the expansion is valid.	
10 The random variable X has pdf $f(x) = \frac{3}{27}x^2$ for $0 \leq x \leq 3$, and 0 otherwise. (a) Find the cumulative distribution function F(x) for $0 \leq x \leq 3$. (b) Find $P(X > \frac{3}{2})$. (c) Find the median of X to 3 s.f.	