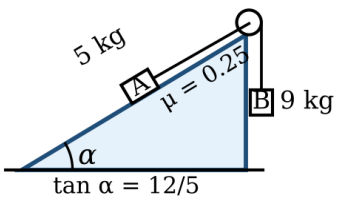
Day 283	A Level Maths: A Tier 10-a-day
1 Particles A (3 kg) and B (5 kg) move towards each other on a smooth horizontal line at 7 m s^{-1} and 3 m s^{-1}. They collide directly, and A then moves in the opposite direction at 3 m s^{-1}. Find (a) the speed of B after the collision, (b) the magnitude of the impulse of A on B.	
2 Given that $\log_a 2 = p$ and $\log_a 3 = q$, express $\log_a\left(\frac{16}{\sqrt{27}}\right)$ in terms of p and q.	
3 Find the sum of all the integers from 1 to 139 inclusive that are not multiples of 4.	
4 On each independent trial, the probability that a basketball player scores is $\frac{1}{4}$. X is the number of trials up to and including the first success. (a) Find P(X = 3) and E(X). (b) Find the least m with $P(X \leq m) > 0.9$.	
5 The system is released from rest and A moves up the rough plane. Find (a) the acceleration, (b) the tension in the light string. Take g = 9.8. Give answers to 3 s.f. if not exact. 	

Day 283	A Level Maths: A Tier 10-a-day
6 An arithmetic series has first term 13 and common difference 1. The sum of the first n terms is 247. Find n.	
7 $X \sim N(58, 10^2)$. Find $P(X > 68 \mid X > 63)$ to 3 significant figures.	
8 A curve has equation $x^2 - xy + 2y^2 = 28$. Find the coordinates of the points where the tangent is parallel to the x-axis.	
9 A geometric series has first term 3 and common ratio $\frac{6}{5}$. Find the smallest n for which the sum of the first n terms exceeds 1000.	
10 The tangent to the curve $y = e^{\frac{1}{3}x}$ at the point P passes through the origin. Find the coordinates of P and the equation of the tangent.	