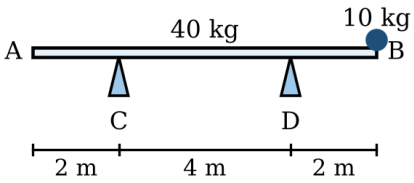
Day 85	A Level Maths: A Tier 10-a-day
1 Find the quotient and the remainder when $6x^3 - x^2 - 24x - 20$ is divided by $(3x + 4)$.	
2 A curve has equation $3x^2 - 2xy + 2y^2 = 15$. Find the coordinates of the points where the tangent is parallel to the x-axis.	
3 A uniform beam AB rests on supports at C and D, with a particle attached at B. Find the reactions at C and D. Take g = 9.8. 	
4 A curve has parametric equations $x = 2t^2 - 4$, $y = 2t(t^2 - 16)$. Find the coordinates of the points where the curve meets the x-axis.	
5 A particle of mass 5 kg is acted on by forces $\mathbf{F}_1 = (32\mathbf{i} + 15\mathbf{j})$ N and $\mathbf{F}_2$. Its acceleration is $(4\mathbf{i} + 2\mathbf{j})$ m s^{-2}. Find (a) $\mathbf{F}_2$, (b) the angle between $\mathbf{F}_2$ and $\mathbf{i}$, to 1 d.p.	

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6 For small θ (in radians), use the small angle approximations to find the value that $\frac{1-\cos 4\theta}{\theta \sin 3\theta}$ approaches as $\theta \to 0$.	
7 The marks of two groups: class A has n = 32, mean 32, sd 7; class B has n = 16, mean 23, sd 2. Find the mean and standard deviation of all 48 values (3 s.f. for the sd).	
8 Prove by contradiction that there are no integers x and y such that $x^2 - y^2 = 10$.	
9 A curve has parametric equations x = 4sec t, y = 2tan t. Find $\frac{dy}{dx}$ in terms of t and the exact equation of the tangent at the point where $t = \frac{\pi}{4}$, in the form y = mx + c.	
10 X ~ B(22, p). H_0: p = 0.4 is tested against H_1: p > 0.4 using a 5% significance level. (a) Find the critical region. (b) State the probability of a Type I error. (c) Find the probability of a Type II error when p = 0.5 (3 s.f.).	