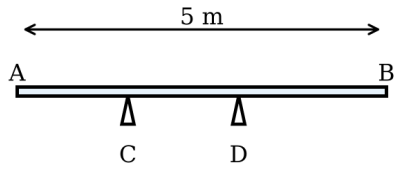
Day 177	A Level Maths: B Tier 10-a-day
1 The vector $\mathbf{a} = \begin{pmatrix} 7 \\ -6 \\ 6 \end{pmatrix}$. Find $\lvert\mathbf{a}\rvert$ and a unit vector in the direction of $\mathbf{a}$.	
2 Solve $-3x - 1 > 3x - 1$.	
3 A car of mass 1500 kg moves along a straight horizontal road. The engine produces a driving force of 1800 N and the resistance to motion is 900 N. Find the acceleration of the car.	
4 Solve $2^x > 52$, giving your answer to 3 s.f.	
5 $f(x) = x^3 + kx^2 + 19x + 12$. Given that $(x + 1)$ is a factor of $f(x)$, (a) find the value of k, (b) factorise $f(x)$ completely.	

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6 A uniform plank AB of length 5 m and mass 80 kg rests horizontally on supports at C and D, where AC = 1.5 m and DB = 2 m. A girl of mass 20 kg walks from D towards B. Find how far she is from D when the plank is about to tilt. 	
7 Prove that the sum of 3 consecutive odd integers is always a multiple of 3.	
8 The probability that a student passes a driving test first time is thought to be 0.5. In a sample of 50 students, 31 pass first time. Test, at the 5% significance level, whether the probability is different from 0.5.	
9 Given that $9\cos\theta + 12\sin\theta \equiv 15\cos(\theta - 53.1°)$, solve $9\cos\theta + 12\sin\theta = -0.5$ for $0 \leq \theta \leq 360°$. (1 d.p.)	
10 Given that each trap catches a rabbit independently with probability 0.3, find the least number of traps needed for the probability of at least one success to exceed 0.99.	