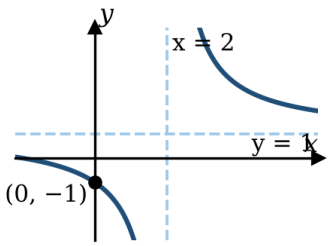
Day 14	A Level Maths: C Tier 10-a-day
1 A line has equation $\mathbf{r} = \begin{pmatrix} 3 \\ -1 \\ -3 \end{pmatrix} + t\begin{pmatrix} -2 \\ 3 \\ 2 \end{pmatrix}$. Write down a vector equation of the line through the origin, parallel to this line.	
2 A car travelling at 24 m s^{-1} brakes uniformly and comes to rest after travelling 96 m. (a) Find the deceleration. (b) Find the time taken to stop.	
3 P(A) = 0.1, P(B) = 0.4 and P(A ∩ B) = 0.04. (a) Find P(A | B). (b) Are A and B independent? Give a reason.	
4 A crate of mass 20 kg is pulled along rough horizontal ground at constant speed by a horizontal force of 58.8 N. Take g = 9.8 m s^{-2}. Find the coefficient of friction between the crate and ground.	
5 θ is small and measured in radians. Use the small angle approximations to find an approximation for 2 sin θ + cos θ.	

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6 Prove by contradiction that there are no integers x and y such that $3x + 9y = 91$.

7 By writing 75° as 30° + 45°, find the exact value of cos 75°.

8 The diagram shows the graph of $y = \frac{k}{x - a} + c$ with its asymptotes. Find the values of a, c and k.



9 $X \sim B(15, p)$. H_0: $p = 0.2$, H_1: $p > 0.2$.
Find the critical region for a test at the 1% significance level.

10 Write $x^2 + 8x - 1$ in the form $(x + p)^2 + q$, and state the coordinates of the minimum point of $y = x^2 + 8x - 1$.