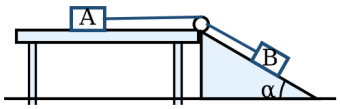
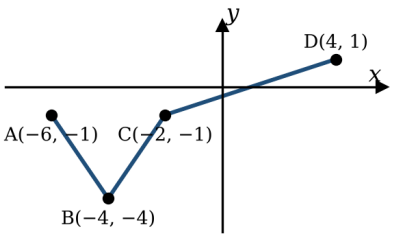
Day 188 **A Level Maths: S Tier 10-a-day**

1 Solve $\cos 2\theta + 3\sin\theta - 2 = 0$
for $0 \leq \theta < 2\pi$, giving answers in terms of π.

2 Particle A (2 kg) lies on a rough table with $\mu = 0.3$, and is joined by a light string over a smooth pulley (see diagram) to particle B (2 kg) on a smooth slope, $\alpha = 30°$.
Released from rest, the string is cut when B has moved 2.25 m. Find the further distance A slides before stopping.



3 The diagram shows y = f(x), made of three straight line segments. Find the coordinates of the images of A, B, C and D on the graph of $y = 3f(-2x + 8) - 3$.



4 Car A passes a point O travelling at a constant speed of 14 m s^{-1}. 7 s later, car B leaves O from rest with constant acceleration 3 m s^{-2}, travelling in the same direction.
B overtakes A at the point X. Find (a) the time B takes to reach X, (b) the distance OX, (c) the speed of B at X.

5 12 recorded times (seconds) have mean 23 and standard deviation 3.
One value was recorded as 24 but should have been 16.
Find the correct mean and the correct standard deviation.

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6 A curve has parametric equations $x = 3 \sin t$, $y = 3 \cos 2t$. Find a cartesian equation of the curve in the form $y = f(x)$.	
7 For events A and B, $P(A) = 0.4$, $P(B) = 0.25$ and $P(A \mid B) = 0.7$. (a) Find $P(A \cap B)$. (b) Find $P(A \mid B')$.	
8 $u_{n+1} = u_n + 3n - 5$, $u_1 = 6$. (a) Show that $u_n = an^2 + bn + c$ and find a, b, c. (b) Find the least n for which $u_n > 1022$.	
9 $\frac{dy}{dx} = e^{x-y}$, and $y = \ln 5$ when $x = 0$. Show that $e^y = e^x + 4$ and hence find y in terms of x.	
10 The curve C has equation $y = \frac{-3x + 17}{x - 3}$. (a) Write down the equations of the asymptotes of C. (b) The line $y = -2x + k$ is a tangent to C. Find the possible values of k.	