Day 232	A Level Maths: B Tier 10-a-day
1 Regression line (x from 2 to 10): $y = 3.2 + 0.8x$. x is the advertising spend, y the weekly sales. (a) Interpret the gradient. (b) Estimate y when x = 13 and comment.	
2 Find the exact value of $\int_0^{\frac{\pi}{2}} (6 \sin x + \cos x)\, dx$.	
3 A box of mass 8 kg rests on a rough horizontal floor, with coefficient of friction 0.25. A horizontal force of 24 N is applied to the box. Take $g = 9.8$ m s^{-2}. Determine whether the box moves. Find the friction force, or the acceleration if it moves.	
4 Given that $y = \frac{1}{(5x + 4)^2}$, find $\frac{dy}{dx}$, and the gradient of the curve when x = 0.	
5 For 10 pairs of values, $\bar{x} = 5$, $\bar{y} = 25$, $S_{xx} = 40$ and $S_{xy} = -80$. (a) Find the regression line of y on x in the form $y = a + bx$. (b) Estimate y when x = 2.	

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6 A curve has parametric equations $x = 2 \sin t$, $y = 5 \cos 2t$. Find $\frac{dy}{dx}$ in terms of t, and its exact value when $t = \frac{\pi}{4}$.	
7 A curve has equation $y = \frac{-1}{x - 4} + 3$. (a) Write down the asymptotes. (b) Find where the curve crosses the axes.	
8 A block of mass 4 kg is released from rest on a rough plane inclined at angle α to the horizontal, where $\tan \alpha = \frac{3}{4}$. The coefficient of friction is 0.125. Take $g = 9.8$ m s^{-2}. Find the acceleration down the plane, and the distance moved in 2 s.	
9 Find the sum of all the multiples of 11 that lie between 98 and 383.	
10 Prove, by exhaustion, that a cube number cannot be written in the form $9k + 7$, where k is an integer.	