Day 197	A Level Maths: C Tier 10-a-day
1 Simplify $4\sin^2 x + 4\cos^2 x$.	
2 A researcher wants to find out the health of the residents of a village. Give one advantage and one disadvantage of using quota sampling.	
3 A is (4, −3) and B is (4, −9). Find (a) the midpoint of AB, (b) the length of AB, as a surd in simplest form.	
4 A curve has equation $x^2 + y^2 = 169$. Find dy/dx in terms of x and y, and hence the gradient at (−5, −12).	
5 A particle moves in a straight line. Its acceleration at time t seconds is $(2t - 3)$ m s^{-2}. When t = 0 its velocity is 1 m s^{-1}. Find its velocity when t = 5.	

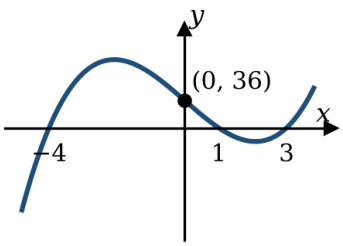
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6 Use the substitution u = sin x to find $\int 3 \cos x \sin^2 x \, dx$.

7 $f(x) = \frac{1}{x - 1} + 2$, $x \neq 1$.
Find the range of f.

8 A particle of mass 4 kg changes its speed from 5 m s^{-1} to 11 m s^{-1}. Find the increase in its kinetic energy.

9 The diagram shows the curve y = f(x), where f(x) is a cubic. Find f(x) in the form k(x − a)(x − b)(x − c).



10 A and B are mutually exclusive, with P(A) = 0.35 and P(B) = 0.45.
(a) Find $P(A \cup B)$.
(b) Find the probability that neither A nor B happens.