Day 299 **A Level Maths: C Tier 10-a-day**

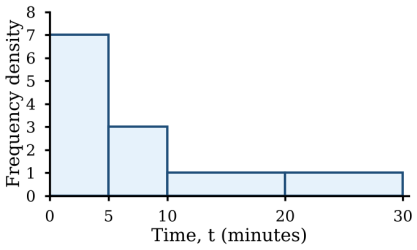
1 Two cyclists start at the same time from points P and Q, 33 m apart, and cycle directly towards each other at constant speeds of 7 m s^{-1} and 4 m s^{-1}. Find the time until they meet.

2 Find

(a) $\int \frac{5}{x}\, dx$

(b) $\int 10 \sin 2x\, dx$

3 The histogram shows the times, t minutes, taken by some people to complete a puzzle. Find the number of people who took between 5 and 10 minutes.



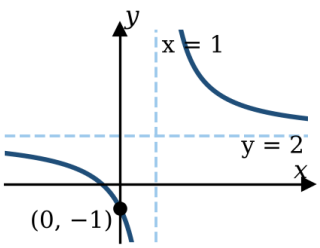
4 Use the product rule to differentiate $y = x^2 \sin 3x$.

5 Solve the simultaneous equations: $y = x^2 + 2x + 6$, $y = -x + 6$.

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6 A particle moving in a straight line with constant acceleration 1 m s^{-2} travels 57.5 m in 5 s.
Find its initial speed.

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



8 X ~ B(15, p). H_0: p = 0.2, H_1: p < 0.2.
In a sample, x = 1. It is given that P(X ≤ 1) = 0.1671.
Test H_0 at the 10% significance level.

9 The line $y = -4x + k$ is a tangent to the curve $y = x^2 + 6$.
Find the value of k.

10 Solve $2 \cos x = -1$ for $0 \leq x \leq 2\pi$.
Give your answers to 3 significant figures.