Day 365	A Level Maths: C Tier 10-a-day
1 (a) Convert 120° to radians, giving your answer in terms of π. (b) Convert $\frac{3\pi}{5}$ radians to degrees.	
2 A model relates the amount, y litres, left in a tank to the time, t hours, since it was filled by $y = 77 - 7.1t$. Interpret the value 7.1 in this context.	
3 A has coordinates $(-3, -1, 2)$ and B has coordinates $(-9, 8, 0)$. Find (a) the vector AB, (b) the distance AB, (c) the midpoint of AB.	
4 A curve has parametric equations $x = 5t$, $y = \frac{6}{t}$, $t \neq 0$. Find a Cartesian equation of the curve.	
5 A particle moves in a straight line. Its velocity at time t seconds $(0 \leq t \leq 8)$ is $v = (-2t^2 + 16t)$ m s^{-1}. Find the maximum velocity and the time at which it occurs.	

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6 The nth term of an arithmetic sequence is $2n + 3$. Find the smallest n for which the term exceeds 400.	
7 Two cyclists start at the same time from points P and Q, 252 m apart, and cycle directly towards each other at constant speeds of 11 m s^{-1} and 7 m s^{-1}. Find the time until they meet.	
8 X has probability density function $f(x) = \frac{1}{8}x$ for $0 \leq x \leq 4$, and 0 otherwise. Find $P(X < 1)$.	
9 A farmer has 20 m of fencing for three sides of a rectangular pen; the fourth side is a wall. Find the maximum area of the pen.	
10 Solve $x^2 + 6x + 4 = 0$, giving your answers in the form $p \pm \sqrt{q}$.	