Day 315	A Level Maths: B Tier 10-a-day
1 A sector of a circle has radius 14 cm and angle 72°. Find, in terms of π, the arc length and the area of the sector.	
2 A curve has parametric equations $x = 3t^2$, $y = 3t$, $t \in \mathbb{R}$. Find a Cartesian equation of the curve.	
3 A ball is projected vertically upwards with speed 17 m s^{-1} from ground level. Take $g = 9.8$ m s^{-2}. Find, to 3 significant figures, (a) the greatest height reached, (b) the time of flight.	
4 Solve $\log_3(x + 4) - \log_3(x - 2) = 1$.	
5 A and B are independent events with $P(A) = 0.2$ and $P(A \cup B) = 0.8$. (a) Find $P(B)$. (b) Find $P(A' \cap B')$.	

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6 A is the point $(-2, 5)$ and B is the point $(0, -4)$. Find the perpendicular bisector of AB as $ax + by + c = 0$, with integer a, b, c.	
7 Use the substitution $u = e^x + 1$ to find the exact value of $\int_0^{\ln 2} (e^x + 1)^2 e^x \, dx$.	
8 A particle moves so that at time t s its velocity is $\mathbf{v} = (3t^2 + 3)\mathbf{i} + (4t - 16)\mathbf{j}$ m s^{-1}. Find the time when the particle is moving in the direction of $\mathbf{i}$, and its speed then.	
9 $X \sim B(100, 0.25)$. Use a normal approximation to find $P(X \geq 30)$, to 3 significant figures.	
10 The line $3x + 4y = k$ is a tangent to the circle $(x + 3)^2 + y^2 = 100$. Find the two possible values of k.	