Day 342	A Level Maths: A Tier 10-a-day
1 Solve $3\sec^2\theta - 18\tan\theta + 21 = 0$ for $-180° \leq \theta \leq 180°$. Give answers to 1 d.p.	
2 Find the quotient and the remainder when $3x^4 + x^3 + 10x^2 + 4x + 8$ is divided by $(x^2 + 2)$.	
3 A 1500 kg car has engine power 60 kW and constant resistance 800 N. Find (a) its greatest steady speed on a horizontal road, (b) its acceleration at 20 m s^{-1} up a hill where $\sin\alpha = \frac{1}{20}$. Take g = 10. Give answers to 3 s.f. if not exact.	
4 A is (3, 6) and B is (5, −2). (a) Find the equation of the perpendicular bisector of AB, in the form ax + by = c. (b) The perpendicular bisector meets the x-axis at P. Find the area of triangle ABP.	
5 f(x) = 3 arcsin(5x). State the domain and range of f, and find $f^{-1}(x)$.	

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6 X has a binomial distribution with mean 3 and variance 2.4. (a) Find n and p. (b) Find P(X = 2) to 3 significant figures.	
7 Solve $2\cos^2 x + 3\sin x - 3 = 0$ for $0° \leq x \leq 360°$.	
8 Eggs are defective with probability 0.15, independently. A tray of 9 eggs is rejected if it has at least 2 defective. From 6 such trays, find the probability that exactly 3 are rejected (3 s.f.).	
9 A ball is projected from the ground at 26 m s^{-1} at angle α above the horizontal, $\tan\alpha = \frac{15}{8}$. At time T s, while in flight, it is moving perpendicular to its initial direction. Find (a) T, (b) the height of the ball then. Take g = 9.8. Give answers to 3 s.f. if not exact.	
10 Find the coefficient of x^3 in the expansion of $(2 + 2x)(2 + 3x)^6$.	