Day 282	A Level Maths: A Tier 10-a-day
1 P(A) = 0.3, P(B) = 0.8 and P(A ∩ B) = 0.15. Find (a) P(A ∪ B) (b) P(A′ ∩ B′) (c) P(A | B)	
2 The 6th term of an arithmetic sequence is −29 and the 12th term is −59. Find the first term and common difference, and the sum of the first 25 terms.	
3 A uniform ladder AB (25 m, 20 kg) rests with A on rough ground, μ = 0.2, and B against a smooth wall, B being 24 m above the ground. A man of mass 50 kg climbs the ladder. How far along the ladder from A can he climb before it slips?	
4 Solve $4^x - 32^x - 4 = 0$. Give your answer to 3 significant figures if not exact.	
5 Particle A (3 kg) lies on a rough table, μ = 0.5, joined by a light string over a smooth pulley to particle B (5 kg), 2 m above the floor. Released from rest; B lands without rebounding. Find (a) the acceleration of A before B lands, (b) the further distance A moves. Take g = 9.8. Give answers to 3 s.f. if not exact.	

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6 12 values have $\Sigma x = 672$ and $\Sigma x^2 = 37932$. One value was recorded as 47 but should have been 51. Find the correct mean and standard deviation (3 s.f.).	
7 $f(x) = 3 + 2\arccos(3x)$. Find the exact value of x for which $f(x) = \frac{\pi + 6}{2}$. Hence state the range of f.	
8 Show that $\frac{2}{\sqrt{2} - 1} + \frac{3}{\sqrt{2} + 1}$ can be written as $p + q\sqrt{2}$, and find p and q.	
9 The line $12x + 5y = -49$ meets the circle $(x + 1)^2 + (y + 4)^2 = 9$ at the points A and B. Find the exact length of AB.	
10 $y = (x + 2)e^{-x}$. Find the exact coordinates of the stationary point and determine its nature.	