Day 264	A Level Maths: S Tier 10-a-day
1 Find the sum of all the integers from 1 to 463 inclusive that are divisible by 6 or by 10, but not by both.	
2 A faulty component is present in 2% of a population. A test is positive for 80% of those with it and for 5% of those without it. Find P(positive) and P(has it | positive).	
3 A lift of mass 400 kg, carrying a passenger of mass 90 kg, is supported by a vertical cable. The lift is moving downwards and accelerating at 0.4 m s^{-2}. Find (a) the force the floor exerts on the passenger, (b) the tension in the cable. Take g = 9.8 m s^{-2}.	
4 Find the set of values of x for which both $x^2 + 10x + 24 > 0$ and $-2x - 6 > 1$.	
5 Two fair 10-sided dice, numbered 1 to 10, are rolled. M is the smaller of the two scores. (a) Show that $P(M = m) = \frac{(21 - 2m)}{100}$ for m = 1, 2, ..., 10. (b) Find P(M = 7) and E(M).	

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6 A train accelerates uniformly from rest at 0.9 m s^{-2} to a speed of V m s^{-1}, travels at this speed, then decelerates uniformly at 1.5 m s^{-2} to rest. The journey takes 28 s and covers 180 m. Find V and the time spent at constant speed.	
7 Find the coordinates of the points of inflection of $y = \frac{4}{x^2 + 27}$.	
8 $f(\theta) = \frac{3}{34 + 21 \sin \theta + 20 \cos \theta}$ (a) Write 21 sin θ + 20 cos θ as R sin(θ + α), R > 0, 0 < α < 90°. (b) Find the greatest and least values of f(θ), and the smallest positive θ at which the greatest value occurs, to 1 d.p.	
9 Solve $x^4 + 6x^3 + 8x^2 - 6x - 9 < 0$.	
10 A curve has parametric equations $x = 2t^2$, $y = 3t(6 - t)$, for $0 \leq t \leq 6$. The curve meets the x-axis at O and at A. Find the area enclosed between the curve and the x-axis.	