Day 64	A Level Maths: C Tier 10-a-day
1 Differentiate with respect to x: (a) $3 \ln x$ (b) $3e^x + 3 \ln x$	
2 The point P(−5, −6) lies on the curve y = f(x). Write down the coordinates of the image of P on (a) y = 4f(x) (b) y = f(x + 5)	
3 The scores, X, in a test are modelled by $N(95, 5^2)$. Find P(97.5 < X < 105) to 3 s.f.	
4 A lift of mass 500 kg is lowered by a vertical cable with constant acceleration 0.75 m s^{-2} downwards. Take g = 9.8 m s^{-2}. Find the tension in the cable.	
5 12 pairs of data on daily mean temperature and sunshine hours have r = 0.47. Test, at the 5% significance level, for evidence of correlation. The critical value is ±0.5760.	

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6 Solve the simultaneous equations: $y = x^2 - 15$, $y = -x - 3$.	
7 Given that $dy/dx = \frac{x}{y}$ and $y = 1$ when $x = 0$, find y^2 in terms of x.	
8 Find the set of values of x satisfying both $3x - 1 < -16$ and $x^2 + 7x + 6 < 0$.	
9 A particle moves with constant velocity $(-2\mathbf{i} + 3\mathbf{j})$ m s^{-1}. It is at the point with position vector $(-4\mathbf{i} + 2\mathbf{j})$ m at $t = 0$. Find the time when its position vector is $(-18\mathbf{i} + 23\mathbf{j})$ m.	
10 (a) Convert 210° to radians, giving your answer in terms of π. (b) Convert $\frac{\pi}{12}$ radians to degrees.	