Day 130	A Level Maths: B Tier 10-a-day
1 20 pairs of rainfall and crop yield give $r = -0.264$. One-tailed critical value (5%): 0.3783. Test for negative correlation.	
2 Find the exact value of $\int_1^2 (3x^2 + \frac{3}{x})\,dx$.	
3 An arithmetic sequence has 3rd term 37 and 12th term 118. (a) Find the first term and the common difference. (b) Find the sum of the first 15 terms.	
4 A sports car starts from rest and accelerates at $2\ \text{m s}^{-2}$. At that moment it is passed by a coach travelling at constant speed $9\ \text{m s}^{-1}$. Find how long it takes to catch up, and the distance travelled.	
5 Find the set of values of x for which $4x + 4 \geq -5$ and $x^2 + x - 30 > 0$.	

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6 A particle is in equilibrium under three forces: P N at angle θ above the positive x-axis, a force of 60 N in the negative x-direction and a force of Q N in the negative y-direction.

$\cos\theta = \frac{15}{17}$. Find P and Q.

7 Solve $e^{2x} - e^{x} - 6 = 0$,
giving any answers as exact values.

8 X ~ B(100, 0.6). Use a normal approximation to find $P(X \leq 58)$, to 3 significant figures.

9 Line l_1: $\mathbf{r} = \begin{pmatrix} 2 \\ 7 \\ -4 \end{pmatrix} + \lambda \begin{pmatrix} 1 \\ 3 \\ -2 \end{pmatrix}$.

Line l_2: $\mathbf{r} = \begin{pmatrix} -5 \\ 2 \\ -2 \end{pmatrix} + \mu \begin{pmatrix} 3 \\ 1 \\ 0 \end{pmatrix}$.

Show that l_1 and l_2 intersect and find the point.

10 The diagram shows the curve y = f(x), a quadratic.
(a) Find the coordinates of the local maximum point of y = |f(x)|.
(b) How many solutions has |f(x)| = 10?

