Day 48	A Level Maths: C Tier 10-a-day
1 Differentiate with respect to x: (a) $2e^{4x}$ (b) $2e^{x} + 4 \ln x$	
2 Two cyclists start at the same time from points P and Q, 182 m apart, and cycle directly towards each other at constant speeds of 7 m s^{-1} and 6 m s^{-1}. Find the time until they meet.	
3 Find the exact value of $\int_0^1 5e^{4x}\,dx$.	
4 The point P(1, 3) lies on the curve y = f(x). Write down the coordinates of the image of P on (a) y = f(x + 1) (b) y = f(x − 1)	
5 A block of mass 4 kg is pulled along rough horizontal ground at constant speed by a horizontal force of 9.8 N. Take g = 9.8 m s^{-2}. Find the coefficient of friction between the block and ground.	

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6 A bag has 2 red and 6 blue sweets. Two are taken at random without replacement. Find the probability that at least one of them is red.	
7 Expand $(1 - 2x)^{-2}$ in ascending powers of x up to and including the term in x^2. State the range of values of x for which the expansion is valid.	
8 Solve $\cos x = -\frac{\sqrt{2}}{2}$ for $0 \leq x \leq 2\pi$. Give your answers in terms of π.	
9 X has probability density function $f(x) = \frac{2}{9}x$ for $0 \leq x \leq 3$, and 0 otherwise. Find $P(X < 1)$.	
10 $f(x) = 2x^3 - 6x^2 - 36x + 80$ (a) Show that $(x + 4)$ is a factor of f(x). (b) Factorise f(x) completely.	