Day 362	A Level Maths: A Tier 10-a-day
1 Find the quotient and the remainder when $6x^3 + x^2 - 27x - 16$ is divided by $(3x + 5)$.	
2 $y = \cot(2x)$. Find $\frac{dy}{dx}$ and its exact value at $x = \frac{\pi}{12}$.	
3 $P(A) = 0.35$, $P(B) = 0.6$ and $P(A \cap B) = 0.05$. Find (a) $P(A \cup B)$ (b) $P(A' \cap B')$ (c) $P(B' \mid A')$	
4 A lift of mass 400 kg carries a person of mass 60 kg. The cable tension is 4692 N and the lift is accelerating. Find (a) the magnitude and direction of the acceleration, (b) the force of the floor on the person. Take $g = 9.8$.	
5 Express $\frac{x^2 - 2x - 24}{(x - 2)(x + 2)}$ in the form $1 + \frac{A}{(x - 2)} + \frac{B}{(x + 2)}$, where A and B are constants to be found.	

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6 $f(x) = 2 + 2\arccos(3x)$. Find the exact value of x for which $f(x) = \frac{\pi + 6}{3}$. Hence state the range of f.	
7 The length of a plank is $N(75, 5^2)$. A plank is classed as 'special' if its length is less than 84. 12 planks are chosen at random. Find the probability that exactly 4 are special (3 s.f.).	
8 Solve $3\sec^2 x + 9\tan x + 3 = 0$ for $0° \leq x \leq 360°$. Give answers to 1 d.p.	
9 The line $12x + 5y = k$ is a tangent to the circle $(x + 2)^2 + (y + 2)^2 = 36$. Find the two possible values of k.	
10 Car A passes P at constant speed 12 m s^{-1}. 6 s later car B leaves P from rest, in the same direction, with acceleration 3 m s^{-2}. B overtakes A at Q. Find (a) the time B takes to reach Q, (b) PQ, (c) the speed of B at Q.	