Day 157	A Level Maths: B Tier 10-a-day
1 Find the x-coordinate(s) of the stationary point(s) of the curve $y = \frac{x}{x^2 + 1}$.	
2 A circle has equation $x^2 + y^2 - 8x - 4y + 2 = 0$. Find the coordinates of its centre and its radius.	
3 Solve $\sin(x + 0.3) = -0.1$ for $0 \leq x \leq 2\pi$, giving answers to 3 significant figures.	
4 Find the quotient and the remainder when $x^3 - x^2 - 5x + 5$ is divided by $(x - 2)$.	
5 A particle of mass 5 kg is acted on by forces $(3\mathbf{i} - 5\mathbf{j})$ N and $\mathbf{P}$ N only. Its acceleration is $(2\mathbf{i} - 2\mathbf{j})$ m s^{-2}. Find $\mathbf{P}$, and its magnitude to 3 significant figures.	

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6 $X \sim B(20, p)$. H_0: $p = 0.4$ is to be tested against H_1: $p < 0.4$ at the 5% significance level. Find the critical region and the actual significance level.	
7 A curve has parametric equations $x = t^2$, $y = t^3$. Find $\frac{dy}{dx}$ in terms of t, and the equation of the tangent at $t = -1$.	
8 A particle of mass 7 kg is suspended in equilibrium by two light strings attached to a horizontal ceiling. The strings make angles α and β with the ceiling, where $\tan\alpha = \frac{3}{4}$ and $\tan\beta = \frac{4}{3}$. Take $g = 9.8$ m s^{-2}. Find the tension in each string.	
9 The length X cm of a metal rod is normal with s.d. 4. Given $P(X < 59.3) = 0.99$, find the mean (3 s.f.).	
10 Express $\frac{-7x + 15}{(2x - 3)(x - 3)}$ in partial fractions.	