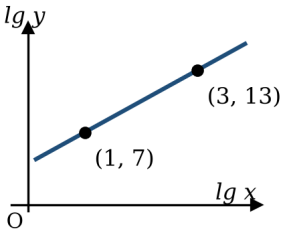
Day 331	A Level Maths: A Tier 10-a-day
1 The region bounded by the curve $y = x^2 + 1$, the x-axis, $x = 0$ and $x = 3$ is rotated through 360° about the x-axis. Find the exact volume of the solid formed.	
2 Evaluate $\sum_{r=6}^{16} (5r - 1)$.	
3 Solve $3^{3x+2} = 2^{2x+1}$. Give your answer to 3 significant figures.	
4 A particle of mass 4 kg is acted on by forces $\mathbf{F}_1 = (28\mathbf{i} - \mathbf{j})$ N and $\mathbf{F}_2$. Its acceleration is $(4\mathbf{i} + \mathbf{j})$ m s^{-2}. Find (a) $\mathbf{F}_2$, (b) the angle between $\mathbf{F}_2$ and $\mathbf{i}$, to 1 d.p.	
5 On each independent trial, the probability that a basketball player scores is $\frac{2}{5}$. X is the number of trials up to and including the first success. (a) Find P(X = 3) and E(X). (b) Find the least m with $P(X \leq m) > 0.9$.	

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6 Express $\frac{-11x + 8}{(3x - 3)(x - 4)}$ in partial fractions.

7 The random variable X has probability density function f(x) = kx(2 − x) for 0 ≤ x ≤ 2, and 0 otherwise.
(a) Find k. (b) Find E(X). (c) Find P(X > 1).

8 The diagram shows the graph of lg y against lg x for $y = A x^n$.
Find the value of n and the value of A.



9 A charity raises £400 in its first year and in each later year raises £50 more than in the previous year.
(a) How much does it raise in year 13? (b) In which year does the total raised first exceed £5000?

10 A particle P has position vector $\mathbf{r} = (2t^3 - 3t)\mathbf{i} + (t^2 - 2t)\mathbf{j}$ metres at time t s. Find (a) the speed of P when t = 2, (b) the value of t when P is moving parallel to **i**. Give answers to 3 s.f. if not exact.