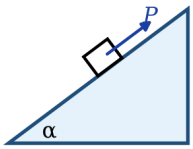
Day 1	A Level Maths: B Tier 10-a-day
1 Two forces ($\mathbf{i} - 2\mathbf{j}$) N and ($7\mathbf{i} + 8\mathbf{j}$) N act on a particle of mass 5 kg. Find the magnitude of the acceleration of the particle.	
2 Items numbered 1 to 180; systematic sample of size 15. (a) Find the sampling interval. (b) The first item is number 4. Find the 4-th item.	
3 The first term of an arithmetic series is 4 and the common difference is 3. The sum of the first n terms is 781. Find the value of n.	
4 A battery lasts X hours, normal with mean 100, s.d. 8. Find k (3 s.f.): (a) $P(X < k) = 0.1$, (b) $P(X > k) = 0.05$.	
5 Solve $2\tan^2 x - 5\sec x + 5 = 0$ for $0 \leq x \leq 360°$, giving answers to 1 d.p.	

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6 A block of mass 4 kg is held on a rough plane ($\tan\alpha = \frac{3}{4}$, $\mu = 0.25$) by a force P N up the plane, as shown.
Take $g = 9.8$ m s^{-2}. The block is about to move up the plane. Find P.



7 (a) Expand $(9 - 4x)^{\frac{3}{2}}$ in ascending powers of x up to and including the term in x^3.
(b) State the range of values of x for which the expansion is valid.

8 (a) Write $\frac{2x - 1}{(x + 1)(x + 4)}$ in partial fractions.
(b) Hence evaluate $\int_0^2 \frac{2x - 1}{(x + 1)(x + 4)}\,dx$, giving the answer as a single logarithm.

9 A curve has parametric equations $x = 2t + 3$, $y = -t^2 - 6t - 3$.
The line $y = -x + 3$ meets the curve at two points.
Find the coordinates of these points.

10 A sector of a circle has radius 10 cm and angle 30°.
Find, in terms of π, the arc length and the area of the sector.