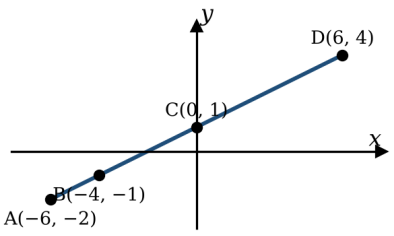
Day 16	A Level Maths: S Tier 10-a-day

1 A stone is thrown vertically upwards with speed 22 m s^{-1} from the top of a cliff. The top of the cliff is 44.4 m above the sea.
Find (a) the time taken for the stone to reach the sea, (b) the total distance travelled by the stone, to 3 s.f. Take g = 9.8 m s^{-2}.

2 $u_{n+1} = u_n + 2n$, $u_1 = 0$.
(a) Show that $u_n = an^2 + bn + c$ and find a, b, c.
(b) Find the least n for which $u_n > 1260$.

3 Solve $6\text{cosec}^2\theta - 5\cot\theta - 12 = 0$
for $0 \leq \theta < 360°$, giving answers to 1 d.p.

4 The diagram shows y = f(x), made of three straight line segments. Find the coordinates of the images of A, B, C and D on the graph of $y = 3f(-2x - 4) - 4$.



5 A seed supplier says that 40% of its seeds germinate. 20 seeds are planted, and 4 germinate.
Test, at the 1% significance level, the claim that the proportion is lower.
Give your conclusion in context.

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6 A non-uniform rod AB of length 6 m and mass 5 kg rests on supports at C and D, where AC = 2 m and AD = 4 m, with $R_C = \frac{2}{3} R_D$. Find (a) the distance of the centre of mass from A. A particle of mass m kg at B puts the rod on the point of tilting about D. (b) Find m.	
7 A curve is given by $x = \ln y + 3y^2$. Find dy/dx and d^2y/dx^2 when $y = 1$.	
8 A battery's life, in hours, is $N(74, 6^2)$. Given that it exceeds 80, find the probability that it exceeds 86.	
9 Find the remainder when x^7 is divided by $(x - 1)(x - 3)$.	
10 A curve has parametric equations $x = 3t^2$, $y = 2t(6 - t)$, for $0 \leq t \leq 6$. The curve meets the x-axis at O and at A. Find the area enclosed between the curve and the x-axis.	