| Day 341 | A Level Maths: B Tier 10-a-day |
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| **1** Solve $-10 < 4x < 4$. | |
| **2** A ball is projected vertically upwards from ground level with speed 39.2 m $s^{-1}$.<br>Take g = 9.8 m $s^{-2}$.<br>Find (a) the greatest height reached, (b) the total time before it returns to the ground. | |
| **3** X ~ Po(1.2), modelling the number of emails received per hour.<br>Find, to 3 significant figures,<br>(a) $P(X \leq 2)$<br>(b) $P(X \geq 2)$ | |
| **4** Differentiate $y = 5 \cot 2x$ with respect to x,<br>and find the exact gradient when $x = \frac{\pi}{8}$. | |
| **5** A geometric series has first term 4 and common ratio 4.<br>Find the smallest value of n for which the sum of the first n terms exceeds 50000. | |

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| **6** The volume of a sphere increases at a constant rate of 100 $cm^3s^{-1}$.<br>Find the rate at which the radius is increasing when r = 10 cm, to 3 s.f. | |
| **7** X has a binomial distribution with mean 7.5 and variance 1.875.<br>(a) Find n and p.<br>(b) Find P(X = 7) to 3 significant figures. | |
| **8** A sector of a circle has radius 11 cm and angle 60°.<br>Find the perimeter of the sector, in terms of $\pi$. | |
| **9** Given that $\sqrt{3}$ is irrational, prove by contradiction that $1 + 5\sqrt{3}$ is irrational. | |
| **10** A ball is projected from level ground with horizontal velocity component 25 m $s^{-1}$ and vertical velocity component 24.5 m $s^{-1}$ upwards.<br>Take g = 9.8 m $s^{-2}$.<br>Find (a) the time of flight, (b) the horizontal range. | |