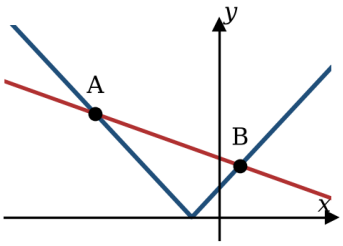
| Day 1 | A Level Maths: A Tier 10-a-day |
|---|---|
| **1** X ~ B(60, 0.25). Use a normal approximation to estimate P(19 ≤ X ≤ 23) to 3 significant figures. | |
| **2** The diagram shows the graphs of $y = \|3x + 2\|$ and $y = -x + 4$.<br>The graphs meet at A and B.<br>Find the coordinates of A and B.<br> | |
| **3** The random variable X has $P(X = x) = kx^2$ for x = 2, 3, 4, 5.<br>(a) Show that $k = \frac{1}{54}$. (b) Find E(X) and Var(X).<br>(c) Find $P(X \geq 3)$. | |
| **4** The equation $x^3 = 3x + 4$ has a root α. Use the iteration $x_{n+1} = \sqrt[3]{3x + 4}$ with $x_0 = 1$<br>to find $x_1$, $x_2$ and $x_3$ to 4 d.p., and hence the value of α to 2 d.p. (continue until the 2 d.p. value is settled). | |
| **5** Particles A (3 kg) and B (2 kg) hang on a light string over a smooth pulley, A being 2.5 m above the ground. Released from rest; A lands without rebounding. Find (a) the tension while both move, (b) the greatest height of B above its start. Take g = 9.8. | |

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|---|---|
| **6** Find the coefficient of $x^3$ in the expansion of $(2 - 2x)(1 + 2x)^8$. | |
| **7** The region bounded by the curve $y = \frac{1}{x}$, the x-axis, $x = 1$ and $x = 5$ is rotated through 360° about the x-axis.<br>Find the exact volume of the solid formed. | |
| **8** Expand $(16 + x)^{\frac{1}{2}}$ in ascending powers of x, up to and including $x^2$.<br>State the range of x for which the expansion is valid. | |
| **9** A curve has equation $-2x^2 + xy + 3x = -21$.<br>Show that P$(-3, -2)$ lies on the curve and find the equation of the tangent at P in the form $ax + by + c = 0$ with integer a, b, c. | |
| **10** A particle moves on the x-axis. At time t s its acceleration is $(3t - 6)$ m $s^{-2}$. When $t = 0$ it is at O with velocity $-6$ m $s^{-1}$. Find (a) its velocity when the acceleration is zero, (b) its displacement from O then. | |