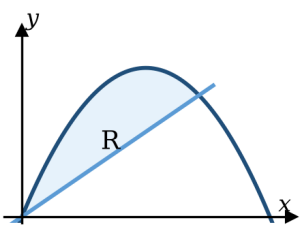
| Day 209 | A Level Maths: B Tier 10-a-day |
|---|---|
| **1** A particle moves in a straight line. At time t seconds its velocity is $v = 3t^2 + 8t + 6$ m s$^{-1}$. Find the distance moved between t = 1 and t = 4. (The particle does not change direction.) | |
| **2** Solve $x^2 - 4 \leq 0$. | |
| **3** A block slides from rest down a line of greatest slope of a smooth plane inclined at α, where $\sin \alpha = \frac{3}{5}$ to the horizontal. Take g = 9.8 m s$^{-2}$. Find its acceleration, and the distance it travels in 4 s. | |
| **4** Express $\frac{2 + 4\sqrt{7}}{4 + 2\sqrt{7}}$ in the form $p + q\sqrt{7}$, where p and q are integers. | |
| **5** The diagram shows the curve $y = x(7 - x)$ and the line y = 2x. Find the exact area of the shaded region R.   | |

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|---|---|
| **6** 8 pairs of height and arm span give r = 0.839. One-tailed critical value (1%): 0.7887. Test for positive correlation. | |
| **7** Solve $\log_3 x + \log_3(x + 6) = 3$. | |
| **8** X ~ B(150, 0.3). Use a normal approximation to find P(41 ≤ X ≤ 45), to 3 significant figures. | |
| **9** A curve has parametric equations x = 2 cos t, y = 5 sin t. Find $\frac{dy}{dx}$ in terms of t, and its exact value when t = $\frac{\pi}{6}$. | |
| **10** The line $y = -2x - 27$ meets the circle $(x + 2)^2 + (y + 3)^2 = 100$ at the points A and B. Find the coordinates of A and B, and the exact length of the chord AB. | |