| Day 326 | A Level Maths: B Tier 10-a-day |
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| **1** A company employs 32 managers, 56 technicians and 60 operators.<br>A stratified sample of size 37 is taken. Find the number selected from each group. | |
| **2** Find the exact value of<br>$\int_1^2 (3e^{2x} + \frac{1}{x})\,dx$. | |
| **3** Find the quotient and the remainder when $3x^3 - 7x^2 - 3x - 4$ is divided by $(x - 3)$. | |
| **4** A car of mass 800 kg moves along a horizontal road. The engine works at a constant rate of 60 kW. The resistance to motion is constant at 400 N.<br>Find the acceleration when the speed is 20 m $s^{-1}$. | |
| **5** Solve $\log_3(x + 15) - \log_3(x - 1) = 1$. | |

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| **6** The circle C has equation $(x - 3)^2 + (y - 3)^2 = 169$.<br>The point P(−2, 15) lies on C.<br>Find an equation of the tangent to C at P, in the form $ax + by + c = 0$ with integer a, b, c. | |
| **7** The probability that a student passes a driving test first time is thought to be 0.25. In a sample of 50 students, 7 pass first time.<br>Test, at the 5% significance level, whether the probability is different from 0.25. | |
| **8** Particles A (4 kg) and B (6 kg) are joined by a light string over a smooth pulley. Both are held with the string taut, B is 8 m above the ground, then released.<br>Take $g = 9.8$ m s$^{-2}$.<br>Find the speed with which B hits the ground. | |
| **9** The curve $y = x^2 - 3x + 1$ and the line $y = -2x + 7$ meet at the points A and B.<br>Find the coordinates of A and B, and the exact length AB. | |
| **10** (a) Write $\frac{2x + 9}{(x + 4)(x + 5)}$ in partial fractions.<br>(b) Hence evaluate $\int_0^1 \frac{2x + 9}{(x + 4)(x + 5)}\,dx$, giving the answer as a single logarithm. | |