| Day 241 | A Level Maths: B Tier 10-a-day |
|---|---|
| **1** Line $l_1$ has equation $x - 7y = -6$ and line $l_2$ has equation $x - 4y = -3$.<br>The lines meet at P. Find the area of the triangle formed by $l_1$, $l_2$ and the x-axis. | |
| **2** The curve C has equation $y = \ln(2x^2 - 1) - 2x$.<br>Find the equation of the tangent to C at the point where $x = 1$, in the form $y = mx + c$. | |
| **3** A box of mass 15 kg rests on a rough horizontal floor, with coefficient of friction 0.25. A horizontal force of 29 N is applied to the box.<br>Take $g = 9.8$ m s$^{-2}$.<br>Determine whether the box moves. Find the friction force, or the acceleration if it moves. | |
| **4** A bag has 6 green and 8 yellow beads; two are taken without replacement.<br>(a) Find P(exactly one green).<br>(b) Find P(at least one green). | |
| **5** A woman of mass 80 kg stands on weighing scales in a lift. The lift decelerates at 0.25 m s$^{-2}$ while moving upwards.<br>Take $g = 9.8$ m s$^{-2}$.<br>Find the force exerted on the woman by the scales. | |

| Day 241 | A Level Maths: B Tier 10-a-day |
|---|---|
| **6** Packet masses are normal, s.d. 5 g. Claimed mean 250 g; 16 packets have mean 248.2 g. Test at the 5% level whether the true mean differs from 250. | |
| **7** $f(x) = 2x^3 + px^2 + qx + 8$. When f(x) is divided by (x + 3) the remainder is $-49$, and when divided by $(x - 1)$ the remainder is 7. Find p and q. | |
| **8** Differentiate $y = 5 \sec 3x$ with respect to x, and find the exact gradient when $x = \frac{\pi}{9}$. | |
| **9** (a) Expand $(1 + 2x)^{-\frac{1}{2}}$ in ascending powers of x up to and including the term in $x^3$. (b) State the range of values of x for which the expansion is valid. | |
| **10** A sector of a circle has radius 9 cm and area $\frac{81\pi}{5}$ $cm^2$. Find the angle of the sector in degrees. | |