| Day 7 | IGCSE 10-a-day |
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| **1** A flight leaves London at 15:15 (London time). It takes 12 hours 35 minutes. When it is 12:00 in London it is 14:00 in Cairo. At what time, in Cairo time, does the flight land? Say if it is on a different day. | |
| **2** $y = 2x^3 - 24x + 8$ Use the second derivative to show that the curve has a maximum at $x = -2$. | |
| **3** ABCD is a parallelogram. A = (0, −2), B = (1, 2) and D = (0, 1). Find the coordinates of C and of the point where the diagonals meet. | |
| **4** $y = 2x^3 - 3x^2 - 7$ At the point where x = 3, is the curve increasing or decreasing? You must show your working. | |
| **5** A sector of a circle has radius 10 cm and angle 240°. (a) Work out the length of the arc of the sector. (b) Work out the area of the sector. Give each answer in terms of $\pi$. | |

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| **6** (a) Write $3x^2 - 18x + 28$ in the form $a(x + p)^2 + q$<br>(b) Write down the coordinates of the turning point of the curve $y = 3x^2 - 18x + 28$ | |
| **7** 51 members of a gym were asked which activities they do.<br>A: use the pool B: use the sauna C: use the studio<br>n(A) = 33, n(B) = 38, n(C) = 25, n(A ∩ B) = 25, n(A ∩ C) = 19, n(B ∩ C) = 17, n(A ∩ B ∩ C) = 14.<br>(a) Work out how many are in none of A, B and C.<br>(b) Work out how many are in exactly one of A, B and C. | |
| **8** A particle moves in a straight line. After t seconds its displacement from O is s metres, where<br>$s = 16t^{\frac{3}{2}} + 3t^2$ $(t \geq 0)$<br>Find the velocity and the acceleration of the particle when t = 4. | |
| **9** The brightness of a lamp is inversely proportional to the square of the distance from the lamp.<br>The distance from the lamp is increased by 300%.<br>Work out the percentage change in the brightness of a lamp. | |
| **10** A is the point (4, 4) and B is the point (10, 0).<br>Find an equation of the perpendicular bisector of AB.<br>Give your answer in the form y = mx + c. | |