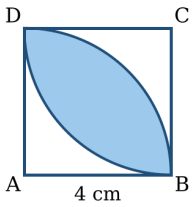
| Day 210 | S Tier 10-a-day |
|---|---|
| **1** A biased spinner lands on one of four outcomes with these probabilities.<br>red: 2x; blue: 0.1; green: 0.2; yellow: 0.5<br>(a) Work out the value of x.<br>(b) The biased spinner is used 100 times. Work out an estimate for the number of times it lands on red. | |
| **2** The curve $y = -x^2 - 4x$ crosses the x-axis at the points A and B.<br>(a) Find the coordinates of A and B.<br>(b) Find the coordinates of the maximum point of the curve. | |
| **3** OA = $\mathbf{a}$ and OB = $\mathbf{b}$.<br>OP = $-\mathbf{a} - \mathbf{b}$, OQ = $-3\mathbf{a} - 7\mathbf{b}$ and OR = $-4\mathbf{a} - 10\mathbf{b}$.<br>(a) Show that P, Q and R lie on a straight line.<br>(b) Work out the ratio PQ : QR in its simplest form. | |
| **4** Solve $3x^2 - 6x - 45 < 0$ | |
| **5** Triangle P has vertices A(−3, −2), B(−5, −5) and C(0, −5).<br>Triangle Q has vertices A'(−3, 7), B'(1, 13) and C'(−9, 13).<br>Q is an enlargement of P.<br>Describe fully the single transformation that maps P onto Q. | |

| Day 210 | S Tier 10-a-day |
|---|---|
| **6** A train travels at a constant speed of 108 km/h. It takes 60 seconds to go completely through a tunnel which is 1,470 m long. Work out the length of the train, in metres. | |
| **7** The value of a house is increased by 15% in one year. The next year its value is increased by 12%. The next year its value is increased by 25%. It is now worth £595,700. Work out the value of the house before the first change. | |
| **8** ABCD is a square of side 4 cm. BD is an arc of a circle with centre A and an arc of a circle with centre C. Work out the area of the shaded region. Give your answer in terms of $\pi$.   | |
| **9** (a) Show that the equation $x^3 - 3x - 21 = 0$ has a solution between x = 3 and x = 4. (b) Show that the equation can be rearranged to give $x = \sqrt[3]{3x + 21}$ | |
| **10** Work out $(7 \times 10^8) - (5.3 \times 10^5)$ Give your answer in standard form. | |