| Day 362 | IGCSE 10-a-day |
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| **1** A curve has equation $y = 2x^3 + 12x^2 + 23x$.<br>Find the minimum value of the gradient of the curve, and the value of x at which it occurs. | |
| **2** Here are six numbers.<br>$\frac{\sqrt{20}}{\sqrt{5}}$, $\sqrt{50}$, $\sqrt{\frac{9}{16}}$, $\pi \div 2$, $(1 + \sqrt{2})^2$, $(2 + \sqrt{5})(2 - \sqrt{5})$<br>Write down the rational numbers. | |
| **3** A van is bought for £12,000.<br>Its value falls by 20% each year.<br>Work out its value after 3 years. (Calculator) | |
| **4** Here are five numbers: $x + 5$, $x + 4$, $x - 2$, $x + 6$, $3x - 1$.<br>The mean of the five numbers is 15.<br>(a) Work out the value of x.<br>(b) Work out the median of the five numbers. | |
| **5** Write $\frac{2}{x + 2} + \frac{3}{x - 5}$ as a single fraction.<br>Simplify the numerator. | |

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| **6** A curve has equation $y = x + \frac{4}{x}$.<br>Find the coordinates of the points on the curve where the gradient is $-3$. | |
| **7** Write $\frac{16^{n+2} \times 2^{n-3}}{8^n}$ in the form $2^{an+c}$<br>where a and c are integers. | |
| **8** $f(x) = \frac{5x-1}{x-k}$, where k is a constant and $x \neq k$.<br>The function f is its own inverse, so $f^{-1}(x) = f(x)$.<br>Find the value of k. | |
| **9** ABCD is a rectangle with AB = 13 cm and AD = 16 cm.<br>A point P inside the rectangle is such that AP $\leq$ 12 cm and P is nearer to AB than to AD.<br>Work out the area of the region in which P can lie. Give your answer in terms of $\pi$. | |
| **10** The curve $y = x^3 - 6x^2 + 9x + k$, where k is a constant, has the x-axis as a tangent.<br>Find the two possible values of k. | |