Day 200 **IGCSE 10-a-day**

1 $f(x) = 3x^2 - 4x - 3$
(a) Find $f'(x)$.
(b) Work out the value of $f'(1)$.

2 $\mathbf{p} = \begin{pmatrix} 6 \\ 5 \end{pmatrix}$, $\mathbf{q} = \begin{pmatrix} 1 \\ -5 \end{pmatrix}$ and $\mathbf{r} = \begin{pmatrix} 2 \\ -1 \end{pmatrix}$.
Work out $\mathbf{p} + 2\mathbf{q} - \mathbf{r}$.

3 Write these numbers in order of size, starting with the smallest.
$\frac{7}{8}$, 38%, 0.34, 0.64

4 The table shows the masses of 120 parcels.
(a) Work out the frequency density for the class $70 < x \leq 80$.
(b) Estimate how many were greater than 55 kg.

Mass (kg)	Frequency
$20 < x \leq 40$	27
$40 < x \leq 45$	23
$45 < x \leq 50$	26
$50 < x \leq 70$	34
$70 < x \leq 80$	10

5 A circular arc has a chord AB of length 32 cm. The greatest distance between the chord and the arc is 4 cm.
Work out the radius of the circle.

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6 A is the point (5, −5) and B is the point (13, 1). Find an equation of the perpendicular bisector of AB. Give your answer in the form ax + by = c, where a, b and c are integers.	
7 The curve $y = 2x^3 - 18x^2 + 48x + k$, where k is a constant, has the x-axis as a tangent. Find the two possible values of k.	
8 There are 20 insects in a sample. The number of insects is multiplied by 4 every day. After how many days will there first be more than 40,000 insects?	
9 A circle has centre C(4, −1) and passes through the point P(6, −5). Find an equation of the circle.	
10 The diagram shows part of the curve $y = 2x^2 - 4x + 2$. A and B are the points on the curve with x coordinates −1 and 1. C is the point on the curve between A and B at which the tangent is parallel to AB. Find the coordinates of C. 	