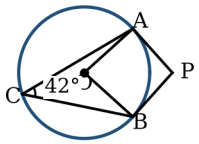
Day 186 **IGCSE 10-a-day**

1 Solve $3x^2 + 3x - 2 = 0$ (Calculator)
Give your answers correct to 2 decimal places.

2 The table shows the number of members in each of four groups.
(a) A stratified sample of 31 is taken. Work out how many come from Group D.
(b) A different stratified sample has 15 from Group B. Work out the size of this sample.

	Group A	Group B	Group C	Group D
Number	350	250	400	550

3 PA and PB are tangents to a circle, centre O. C is a point on the circle. Angle ACB = 42°.
(a) Work out the size of angle AOB.
(b) Work out the size of angle APB.
The diagram is not drawn accurately.



4 $M = \begin{pmatrix} 5 & 5 \\ 1 & 3 \end{pmatrix}$.
(a) Work out the determinant of M.
(b) Find M^{-1}.

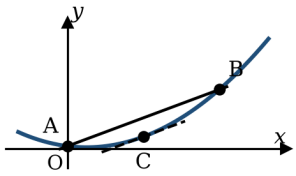
5 $\mathbf{a} = \begin{pmatrix} 4 \\ 3 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} 2 \\ -5 \end{pmatrix}$
Work out the exact length of the vector $\mathbf{a} - \mathbf{b}$.
Give your answer as a simplified surd.

Day 186 **IGCSE 10-a-day**

6 A company makes and sells x thousand items. All amounts are in thousands of pounds.
The revenue is $R = x(29 - 2x)$ and the cost is $C = 22 + 9x$.
(a) Show that the profit $P = R - C$ is $P = -2x^2 + 20x - 22$.
(b) Find the number of items that must be sold for the profit to be a maximum, and this maximum profit.

7 Given that $(a + \sqrt{10})^2 = 26 + 8\sqrt{10}$,
where a is a positive integer, find the value of a.

8 The diagram shows part of the curve $y = 2x^2 - 2x + 1$. A and B are the points on the curve with x coordinates 0 and 4.
C is the point on the curve between A and B at which the tangent is parallel to AB. Find the coordinates of C.



9 $f(x) = \frac{-4x - 7}{x - k}$, where k is a constant and $x \neq k$.
The function f is its own inverse, so $f^{-1}(x) = f(x)$.
Find the value of k.

10 P is the point $(a, \frac{3}{2}a^2)$ on the curve $y = \frac{3}{2}x^2$,
where $a \neq 0$.
The normal to the curve at P meets the y-axis at the point Q.
Show that the y coordinate of Q is $\frac{3}{2}a^2 + \frac{1}{3}$.