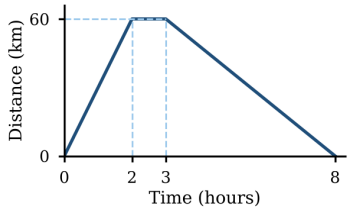
Day 42	IGCSE 10-a-day

1 $\mathbf{a} = \begin{pmatrix} k \\ -4 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} -2 \\ 2 \end{pmatrix}$.
$\mathbf{a}$ is parallel to $\mathbf{b}$.
Find the value of k.

2 A particle P moves in a straight line. After t seconds its displacement from a fixed point O is s metres, where
$s = 2t^3 - 2t^2 + 3t + 3$ $(t > 0)$
Find (a) the velocity of P, (b) the acceleration of P, when t = 2.

3 (a) Show that the equation $x^3 + 7x - 28 = 0$ can be rearranged to give $x = \sqrt[3]{28 - 7x}$ (Calculator)
(b) Use the iteration formula $x_{n+1} = \sqrt[3]{28 - 7x_n}$ with $x_0 = 2$ to work out x_1 and x_2. Give each answer correct to 3 decimal places.

4 The graph shows Jamal's cycle ride to a café and back.
(a) Work out Jamal's speed on the way back.
(b) Work out Jamal's average speed for the whole ride, including the stop.



5 $f(x) = x^3 - 3x + 5$
Find the y coordinate of the local maximum point and the y coordinate of the local minimum point.

Day 42 **IGCSE 10-a-day**

6 (a) Solve $5 - 4x \geq -19$

(b) n is an integer. Write down all the values of n that satisfy

$-4 < 3n - 4 \leq 11$

7 Triangle P has vertices A(4, 4), B(10, 10) and C(2, 0).

Triangle Q has vertices A'(−2, 4), B'(−5, 1) and C'(−1, 6).

Q is an enlargement of P.

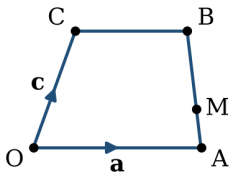
Describe fully the single transformation that maps P onto Q.

8 OABC is a trapezium. OA is parallel to CB and CB = $\frac{2}{3}$OA.

$\mathbf{OA} = \mathbf{a}$ and $\mathbf{OC} = \mathbf{c}$.

(a) Find $\mathbf{AB}$ in terms of $\mathbf{a}$ and $\mathbf{c}$.

(b) AM : MB = 1 : 2. Find $\mathbf{OM}$.



9 $N = 2^3 \times 3^5$

How many of the factors of N are odd numbers?

10 The diagram shows the curve $y = 2x^2 - 2x + 4$ and the normal at P(1, 4), meeting the x-axis at Q. R is (1, 0).

(a) Find the normal in the form $x + ky = c$.

(b) Work out the area of triangle PQR.

