Day 277	IGCSE 10-a-day
1 Simplify fully $5\sqrt{10} \times 3\sqrt{14}$	
2 For $0 \leq x \leq 360$, a graph has equation $y = 3\cos 3x° - 3$ Write down (a) the smallest positive value of x at which y is greatest (b) the greatest value of y	
3 (a) Solve $9 - 2x \geq 11$ (b) n is an integer. Write down all the values of n that satisfy $4 \leq 4n - 4 \leq 32$	
4 A curve has equation $y = 2x^3 - 12x^2 + 36x + 4$. Find the minimum value of the gradient of the curve, and the value of x at which it occurs.	
5 The population of a village decreased by 10% in 2023. In 2024 the population decreased by a further 15%. Work out the overall percentage decrease over the two years.	

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6 A biased four-sided dice lands on one of four outcomes with these probabilities.
1: 3x; 2: x; 3: 2x; 4: 0.7
(a) Work out the value of x.
(b) The biased four-sided dice is used 40 times. Work out an estimate for the number of times it lands on 1.

7 The temperature, T °C, of a metal bar t minutes after it is removed from a heat source is modelled by

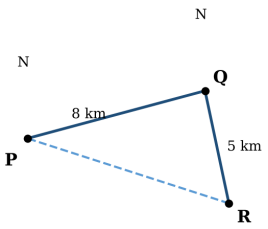
$T = 25 + \frac{32}{t}$ $(t \geq 1)$

(a) Find $\frac{dT}{dt}$ when $t = 4$.

(b) Find the value of t when the temperature is falling at 8 °C per minute.

8 ABCD is a rectangle with AB = 17 cm and AD = 15 cm.
A point P inside the rectangle is such that AP ≤ 12 cm and P is nearer to AB than to AD.
Work out the area of the region in which P can lie. Give your answer in terms of π.

9 A ship sails 8 km from P to Q on a bearing of 075°.
It then sails 5 km from Q to R on a bearing of 168°.
(a) Work out PR (3 s.f.). (b) Work out the bearing of R from P (nearest degree).
(Calculator)



10 A particle moves in a straight line. After t seconds its displacement from a fixed point is s metres, where

$s = t^3 - 3t^2 + 4t - 3$

(a) Show that the particle is never at rest.
(b) Find the least speed of the particle and the time it occurs.