Day 274 **IGCSE 10-a-day**

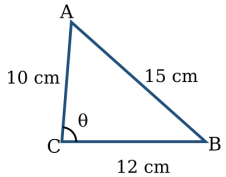
1 A car travels the first half of a journey at 30 km/h.
It travels the second half of the same journey at 70 km/h.
Work out the average speed for the whole journey.

2 $A = \begin{pmatrix} 4 & -4 \\ 5 & -2 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & 1 \\ -4 & 2 \end{pmatrix}$.
(a) Work out AB.
(b) Work out BA.

3 A red light flashes every 4 minutes.
A blue light flashes every 6 minutes.
A green light flashes every 21 minutes.
They all flash together at 6:00 am.
(a) At what time do they next flash together?

4 The function $f(x) = -2x^2 - 12x + 6$ is decreasing when $x > k$.
Find the value of k.

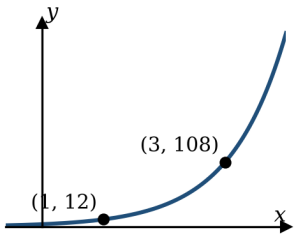
5 The diagram shows triangle ABC. (Calculator)
(a) Work out angle ACB, marked θ, to 1 decimal place.
(b) Work out the area of triangle ABC to 3 significant figures.
The diagram is not drawn accurately.



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6 $y = 2x^4 - 36x^2 - 5$
Find the coordinates of the stationary points of the curve and determine the nature of each.

7 The diagram shows the graph of $y = ka^x$, where k and a are constants and $a > 0$.
The curve passes through the points (1, 12) and (3, 108).
Find the value of k and the value of a.



8 P is the point $(a, 4a^2)$ on the curve $y = 4x^2$, 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 $4a^2 + \frac{1}{8}$.

9 A bag contains x black discs and 2 white discs.
Two discs are taken at random without replacement.
The probability that both are black is $\frac{10}{21}$.
(a) Show that $11x^2 - 51x - 20 = 0$.
(b) Hence work out the number of discs in the bag.

10 $f(x) = \frac{-x + 3}{x + 1}$ where $x \neq -1$
(a) Show that $ff(x) = x$.
(b) Write down $f^{-1}(x)$.