Day 316 **IGCSE 10-a-day**

1 $y = -2x^2 + \frac{3}{x^2}$

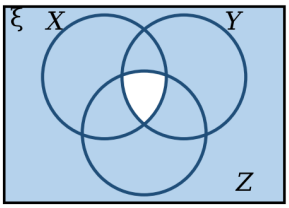
(a) Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$.

(b) Work out the value of $\frac{d^2y}{dx^2}$ when $x = 2$.

2 Here are five numbers: $2x - 3$, $2x + 1$, $x + 4$, $3x + 2$, $3x - 2$.
The mean of the five numbers is 18.
(a) Work out the value of x.
(b) Work out the median of the five numbers.

3 Find $\frac{dy}{dx}$ when $y = 4x^3 + 3x - 8$

4 Write down the set notation for the region shaded in the Venn diagram.



5 Two cones, P and Q, are mathematically similar.
The volume of P is 4 cm^3 and the volume of Q is 32 cm^3.
The curved surface area of P is 2 cm^2.
Work out the curved surface area of Q.

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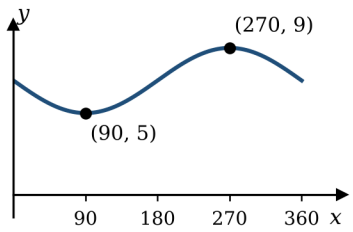
6 $y = (x - 3)^2(x - 4)$

Show that $\frac{dy}{dx} = (x - 3)(3x - 11)$.

7 The diagram shows the graph of $y = a \sin x° + c$ for $0 \leq x \leq 360$.

Some points on the graph are labelled.

Find the value of a and the value of c.



8 Hana invests £5,000 in an account paying compound interest.

The interest rate is the same percentage each year.

After 3 years the account holds £10,985.

Work out the annual percentage interest rate.

9 Solve the simultaneous equations

$x^2 + y^2 = 65$

$y = -2x - 15$

10 $A = \begin{pmatrix} -1 & 1 \\ 2 & -3 \end{pmatrix}$ and $B = \begin{pmatrix} 5 & -7 \\ -1 & 0 \end{pmatrix}$.

$MA = B$, where M is a 2×2 matrix.

Find M.