Day 142 **IGCSE 10-a-day**

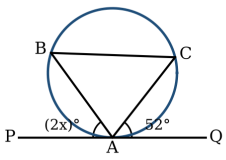
1 The number d is 440 correct to the nearest 10.
Write down the error interval for d.

2 C is directly proportional to the square root of d.
When d = 36, C = 18.
(a) Find a formula for C in terms of d.
(b) Work out the positive value of d when C = 15.

3 The number of visitors to a website, N, after t days is modelled by
$N = -2t^3 + 18t^2 + 5t + 100$ for $0 \leq t \leq 12$
Find the time at which N is increasing most rapidly, and the rate of increase at this time.

4 $\mathbf{p} = \begin{pmatrix} 5 \\ -3 \end{pmatrix}$, $\mathbf{q} = \begin{pmatrix} 0 \\ -6 \end{pmatrix}$ and $\mathbf{r} = \begin{pmatrix} -6 \\ -5 \end{pmatrix}$.
Work out $\mathbf{p} + 2\mathbf{q} - \mathbf{r}$.

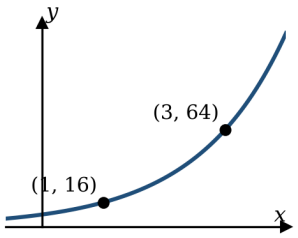
5 PAQ is a tangent to the circle at A. B and C are points on the circle. Angle PAB = (2x)°, angle ACB = (x + 27)° and angle CAQ = 52°.
(a) Work out the value of x.
(b) Work out the size of angle BAC.
The diagram is not drawn accurately.



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6 A curve has equation $y = -2x^3 + 12x^2 - 18x$.
The point A $(-1, k)$ lies on the curve. Work out the value of k and the gradient of the curve at A.

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, 16) and (3, 64).
Find the value of k and the value of a.



8 A particle moves in a straight line. After t seconds its displacement from a fixed point is s metres, where
$s = t^3 - 6t^2 + 21t + 5$
(a) Show that the particle is never at rest.
(b) Find the least speed of the particle and the time it occurs.

9 Without using a calculator, work out $0.\dot{1}\dot{6} + 0.\dot{6}\dot{0}$
Give your answer as a fraction in its simplest form.

10 The table gives information about the masses of some eggs.
An estimate for the mean is 20.5.
Work out the value of x.

Mass, m (g)	Frequency
$10 < m \leq 15$	17
$15 < m \leq 20$	3
$20 < m \leq 25$	x
$25 < m \leq 30$	5
$30 < m \leq 35$	8