Day 249 **IGCSE 10-a-day**

1 Work out the gradient of the curve $y = x^3 + 4x - 1$ at the point where $x = 0$.

2 The 6th term of an arithmetic sequence is 57.
The 9th term of the sequence is 75.
(a) Find an expression for the nth term of the sequence.
(b) Is 226 a term of the sequence? You must show your working.

3 ABC is an isosceles triangle with AB = AC.
Angle BAC = $(5x - 15)°$
Angle ABC = $(3x + 37)°$
(a) Work out the value of x.
(b) Work out the size of angle BAC.

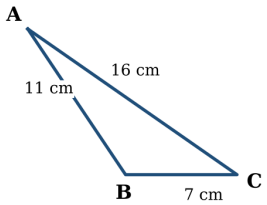
4 The table gives information about 102 masses.
Work out an estimate for the median.
Assume the values in each class are evenly spread.

Mass, m (kg)	Frequency
$0 < m \leq 10$	10
$10 < m \leq 20$	8
$20 < m \leq 30$	16
$30 < m \leq 40$	20
$40 < m \leq 50$	26
$50 < m \leq 60$	22

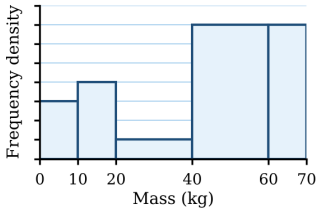
5 A rectangular paddock is x metres wide and y metres long. It is fenced all round and divided into two equal parts by a fence each of length x metres, parallel to the width.
The total length of fencing used is 60 m.
(a) Show that the area of the paddock is $A = -\frac{3}{2}x^2 + 30x$.
(b) Find the maximum possible area, justifying that it is a maximum.

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6 Work out the area of triangle ABC.
Give your answer correct to 3 significant figures. (Calculator)



7 The histogram shows the masses of parcels delivered by a courier.
140 of them had a mass between 40 and 60 kg.
(a) How many had a mass between 10 and 20 kg?
(b) How many parcels are there in total?



8 A runner covers a distance of 640 m, correct to 2 significant figures.
The race takes 2.2 s, correct to 1 decimal place.
Work out the upper bound of the speed.
Give your answer correct to 3 significant figures. (Calculator)

9 A bag contains x black discs and 3 white discs.
Two discs are taken at random without replacement.

The probability that both are black is $\frac{5}{14}$.

(a) Show that $3x^2 - 13x - 10 = 0$.
(b) Hence work out the number of discs in the bag.

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