Day 209 **IGCSE 10-a-day**

1 Solve $\frac{x+1}{2} - \frac{x-7}{5} = 4$

2 A flight leaves London at 10:45 (London time).
It takes 11 hours 35 minutes.
When it is 12:00 in London it is 14:00 in Cairo.
At what time, in Cairo time, does the flight land? Say if it is on a different day.

3 $y = 2x^3 - 18x^2 + 2x - 7$

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

(b) Find the value of x for which $\frac{d^2y}{dx^2} = 0$, and work out the gradient of the curve at this value of x.

4 The table shows the heights of 52 plants.
(a) Write down the modal class.
(b) Work out an estimate for the mean. Give your answer to 1 decimal place. (Calculator)

Height (cm)	Frequency
$0 < x \leq 5$	10
$5 < x \leq 10$	13
$10 < x \leq 15$	16
$15 < x \leq 20$	13

5 A curve has equation $y = 3x^2 - \frac{3}{x}$.

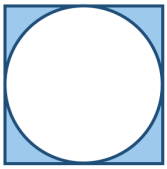
Find the equation of the tangent to the curve at the point where x = 1.

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6 A geometric sequence has term 4 equal to 54 and term 7 equal to 1458.
Find the common ratio and the first term.

7 The number of bacteria in a culture, N, after t hours is modelled by
$N = -t^3 + 6t^2 + 8t + 1000$ for $0 \leq t \leq 8$
Find the time at which N is increasing most rapidly, and the rate of increase at this time.

8 The diagram shows a circle inside a square of side 12 cm.
The circle touches all four sides of the square.
Work out the area of the shaded region. Give your answer in terms of π.



9 $f(x) = \frac{-x + 6}{2x + 1}$ where $x \neq -\frac{1}{2}$
(a) Show that $ff(x) = x$.
(b) Write down $f^{-1}(x)$.

10 A train travels at a constant speed of 72 km/h.
It takes 25 seconds to cross completely over a bridge which is 320 m long.
Work out the length of the train, in metres.