Day 218	IGCSE 10-a-day
1 $y = -6x^4 + 3x^3 + 6x^2 + 6$ Find $\frac{dy}{dx}$	
2 A rectangle has area 15 cm^2, correct to 2 significant figures. Its length is 4 cm, correct to 2 significant figures. Work out the upper bound of the width of the rectangle. Give your answer correct to 3 significant figures. (Calculator)	
3 The curve $y = x^3 - 3x^2 - 2x - 4$ crosses the y-axis at the point A. The tangent to the curve at A meets the x-axis at B. Find the coordinates of B.	
4 The length of a rectangle is decreased by 25%. The width of the rectangle is increased by 20%. Work out the percentage change in the area of the rectangle.	
5 Hassan invests £10,000 at 5% per year compound interest. After how many whole years will the investment first be worth more than £11,900? (Calculator)	

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6 $f(x) = \dfrac{-5x + 5}{3x + 2}$

(a) Find $f^{-1}(x)$.

(b) Find the value of $f^{-1}(-10)$.

7 Simplify $\dfrac{2}{2 + \sqrt{3}} - \dfrac{1}{2 - \sqrt{3}}$

Give your answer with a rational denominator.

8 ABCD is a rectangle with AB = 13 cm and AD = 15 cm.
A point P inside the rectangle is such that AP ≤ 12 cm and P is nearer to AB than to AD.
Work out the area of the region in which P can lie. Give your answer in terms of π.

9 Points A and B are on level ground, 101 m apart, with B between A and the foot of a lighthouse.
The angle of elevation of the top of the lighthouse is 26° from A and 50° from B.
Work out the height of the lighthouse. Give your answer to 3 significant figures. (Calculator)

10 Squares of side x cm are cut from the corners of a 36 cm square cardboard sheet, which is folded into an open box of volume V cm^3.

(a) Show that $V = 4x^3 - 144x^2 + 1296x$.

(b) Find x for the maximum volume, and this volume.

