Day 59 **IGCSE 10-a-day**

1 $f(x) = \frac{-5x - 7}{x - k}$, where k is a constant and $x \neq k$.

The function f is its own inverse, so $f^{-1}(x) = f(x)$.

Find the value of k.

2 The table shows the number of members in each of four groups.

(a) A stratified sample of 26 is taken. Work out how many come from Group B.

(b) A different stratified sample has 9 from Group D. Work out the size of this sample.

	Group A	Group B	Group C	Group D
Number	70	40	120	30

3 A fuel tank is $\frac{1}{8}$ full.

20 more litres of petrol are added and the fuel tank is then $\frac{5}{8}$ full.

Work out the capacity of the fuel tank.

4 The volume, V cm^3, of a sphere of radius r cm is $V = \frac{4}{3}\pi r^3$.

(a) Find $\frac{dV}{dr}$ when r = 4.

(b) Find the value of r when $\frac{dV}{dr} = 100\pi$.

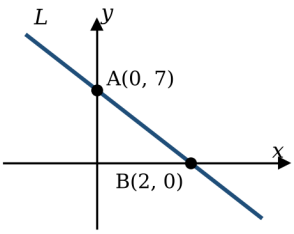
5 T is directly proportional to m.

When m = 3, T = 30.

When m = 6, T = a.

When m = b, T = 100.

Work out the values of a and b.

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6 The diagram shows the straight line L, which passes through the points A and B. The line M is perpendicular to L and passes through B. Find the equation of M in the form y = mx + c. 	
7 Kira, Maya and Tariq share some sweets. Kira : Maya = 7 : 6 Maya : Tariq = 2 : 6 (a) Work out the ratio Kira : Maya : Tariq. (b) They share 186 sweets altogether. How many sweets does Maya get?	
8 A curve has equation $y = x^3 + 2x^2 - 2x - 5$. The tangent to the curve at the point A, where $x = -2$, meets the curve again at the point B. Find the coordinates of B.	
9 ABCD is a rectangle with AB = 8 cm and AD = 13 cm. A point P inside the rectangle is such that AP ≤ 8 cm and P is nearer to A than to B. Work out the area of the region in which P can lie. Give your answer in terms of π and surds.	
10 The normal to the curve $y = x^2 + 3x - 6$ at the point P where $x = -1$ meets the curve again at Q. Find the coordinates of Q.	