Day 117 **IGCSE 10-a-day**

1 The table shows the number of members in each of four groups.
(a) A stratified sample of 28 is taken. Work out how many come from Group B.
(b) A different stratified sample has 33 from Group B. Work out the size of this sample.

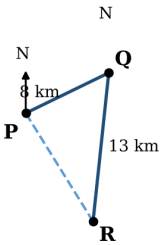
	Group A	Group B	Group C	Group D
Number	450	550	200	200

2 $f(x) = 4x^3 + x^2 - 3x$
(a) Find $f'(x)$.
(b) Work out the value of $f'(3)$.

3 A library has 2.5×10^4 books.
Each book has 4×10^5 words.
Work out the total number of words in all the books.
Give your answer in standard form.

4 Two shapes are mathematically similar.
The smaller has height 40 cm and area 20 cm^2.
The larger has area 7.2 cm^2.
Work out the height of the larger shape.

5 A = (2, 1), B = (−3, −3) and C = (7, −3).
Show that triangle ABC is isosceles.

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6 Write $\sqrt{24} - \sqrt{54} - \sqrt{6} + \sqrt{150}$ in the form $a\sqrt{6}$ where a is an integer.	
7 The line L has equation $20x + 21y = -420$. L crosses the x-axis at the point A and the y-axis at the point B. (a) Find the coordinates of A and B. (b) Work out the length of AB.	
8 A particle moves in a straight line. After t seconds its displacement from a fixed point is s metres, where $s = 2t^3 - 24t^2 + 98t - 4$ (a) Show that the particle is never at rest. (b) Find the least speed of the particle and the time it occurs.	
9 A ship sails 8 km from P to Q on a bearing of 064°. It then sails 13 km from Q to R on a bearing of 186°. (a) Work out PR (3 s.f.). (b) Work out the bearing of R from P (nearest degree). (Calculator) 	
10 A closed cylinder (a tin) has radius r cm, height h cm and total surface area 96π cm^2. (a) Show that its volume, V cm^3, is $V = 48\pi r - \pi r^3$. (b) Find the maximum value of V in terms of π, and show that h = 2r when V is a maximum.	