Day 103 **S Tier 10-a-day**

1 Work out the value of $x^2 - 3yz$
when $x = -4$, $y = 2$ and $z = -4$.

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 A.
(b) A different stratified sample has 15 from Group B. Work out the size of this sample.

	Group A	Group B	Group C	Group D
Number	180	100	60	180

3 Triangle P has vertices A(2, −3), B(1, −1) and C(4, −6).
Triangle Q has vertices A'(4, −3), B'(2, 1) and C'(8, −9).
Q is an enlargement of P.
Describe fully the single transformation that maps P onto Q.

4 Solve $x^{\frac{4}{3}} = 256$
$x > 0$

5 Given that $\sqrt{75} - \sqrt{12} = \sqrt{n}$,
find the value of n.

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6 A is the point (4, −3) and B is the point (12, −9). Find an equation of the perpendicular bisector of AB. Give your answer in the form ax + by = c, where a, b and c are integers.	
7 L is directly proportional to the square root of t. When t = 9, L = 21. (a) Find a formula for L in terms of t. (b) Work out the value of L when t = 25.	
8 Prove that the sum of the squares of any three consecutive integers is always 2 more than a multiple of 3.	
9 A circle has equation $x^2 + y^2 = 25$. The point P(−4, 3) lies on the circle. (a) Find the equation of the tangent to the circle at P. Give your answer in the form ax + by = c, where a, b and c are integers. (b) The tangent meets the x-axis at the point T. Write down the coordinates of T.	
10 $N = 2^3 \times 3 \times 5^3$ How many of the factors of N are even numbers?	