Day 40 **IGCSE 10-a-day**

1 The table shows the number of students in each of four groups.
(a) A stratified sample of 30 is taken. Work out how many come from Year 7.
(b) A different stratified sample has 12 from Year 8. Work out the size of this sample.

	Year 7	Year 8	Year 9	Year 10
Number	200	100	225	225

2 $y = -x^3 + 12x + 3$
At the point where $x = -1$, is the curve increasing or decreasing? You must show your working.

3 Solve the simultaneous equations
$y = x^2 - 2x + 2$
$y = -2x + 18$

4 A particle moves in a straight line. After t seconds its displacement from O is s metres, where
$s = 8t^{\frac{3}{2}} + t^2 \ (t \geq 0)$
Find the velocity and the acceleration of the particle when $t = 16$.

5 Show that $0.\dot{5} = \frac{5}{9}$

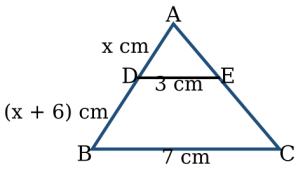
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6 The probability that it rains is $\frac{3}{4}$.

If it rains, the probability that Sam is late is $\frac{1}{6}$. If it does not rain, the probability is $\frac{2}{3}$.

(a) Work out the probability that Sam is late.
(b) Given that Sam is late, work out the probability that it rained.

7 In the diagram, DE is parallel to BC.
AD = x cm, DB = (x + 6) cm, DE = 3 cm and BC = 7 cm.
(a) Find the value of x.
(b) Work out the length of AB.
The diagram is not drawn accurately.



8 The number of bacteria in a culture, N, after t hours is modelled by
$N = -2t^3 + 18t^2 + 10t + 200$ for $0 \leq t \leq 12$
Find the time at which N is increasing most rapidly, and the rate of increase at this time.

9 Write $\frac{3+\sqrt{7}}{3-\sqrt{7}}$ in the form $p + q\sqrt{7}$
where p and q are rational numbers.

10 $\mathbf{a} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} -3 \\ -4 \end{pmatrix}$.
(a) Work out $\mathbf{a} + \mathbf{b}$.
(b) Work out $4\mathbf{a} - 3\mathbf{b}$.