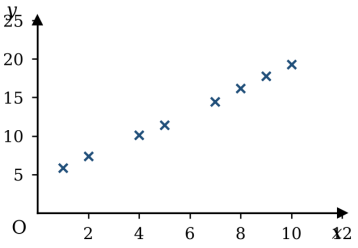
Day 103	A Level Maths: B Tier 10-a-day

1 8 pairs of age of a house and its energy cost give r = −0.795.
Two-tailed critical value (5%): 0.7067.
Test for correlation.

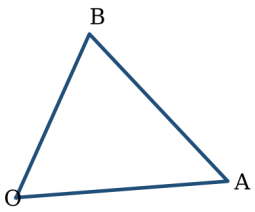
2 A particle moves in a straight line. At time t s its velocity is $v = 6t - 3t^2$ m s^{-1}, for $t \geq 0$.
Find the maximum speed of the particle and the time at which it occurs.

3 (a) Write $3x^2 + 36x + 105$ in the form $a(x + p)^2 + q$.
(b) Write down the coordinates of the minimum point of $y = 3x^2 + 36x + 105$.

4 The scatter diagram shows eight pairs of values of x and y.
(a) Describe the correlation.
(b) Why should y = 4 + 1.5x not be used for x = 15?



5 In triangle OAB, OA = a and OB = b. M lies on AB with AM : MB = 3 : 1, and N lies on OB with ON : NB = 1 : 1.
Find OM and NM in terms of a and b.



Day 103	A Level Maths: B Tier 10-a-day
6 Express $\frac{12}{4-2\sqrt{6}}$ in the form $p + q\sqrt{6}$, where p and q are integers.	
7 $f(x) = x^3 + 3x - 12$. Use the Newton-Raphson method with $x_0 = 2$ to find x_1 and x_2, to 4 d.p.	
8 (a) Expand $(1 - x)^{\frac{1}{2}}$ up to the x^2 term. (b) Use $x = 0.02$ to estimate $\sqrt{0.98}$ to 5 decimal places.	
9 A train accelerates uniformly from rest at 1.5 m s^{-2} for 6 s, then travels at constant speed for 20 s, and finally decelerates uniformly at 1 m s^{-2} to rest. Find the total distance travelled and the total time of the journey.	
10 Squares of side x cm are cut from the corners of a square card of side 30 cm and the sides are folded up to make an open box. Find x for the greatest volume, and that volume.	