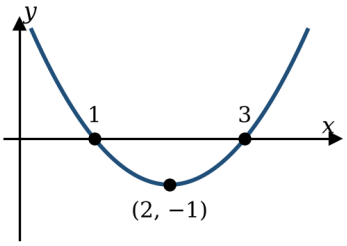
Day 124	A Level Maths: B Tier 10-a-day
1 A remote-control car moves with constant velocity $(3\mathbf{i} - 4\mathbf{j})$ m s^{-1}, where $\mathbf{i}$ and $\mathbf{j}$ are unit vectors east and north. Find its speed and the acute angle its direction makes with $\mathbf{i}$, to 1 d.p.	
2 Ordered data, texts sent in a day by 7 students: 13, 23, 31, 34, 35, 39, 39. Find Q_1, Q_3, the IQR and any outliers (more than 1.5 × IQR beyond a quartile).	
3 Differentiate $y = 3\tan 3x$ with respect to x, and find the exact gradient when $x = \frac{\pi}{12}$.	
4 Express $\frac{3-\sqrt{3}}{5+3\sqrt{3}}$ in the form $p + q\sqrt{3}$, where p and q are integers.	
5 P(B) = 0.25, P(A | B) = 0.6 and P(A) = 0.5. (a) Find $P(A \cap B)$. (b) Find P(B | A). (c) Find $P(A \cup B)$.	

Day 124 **A Level Maths: B Tier 10-a-day**

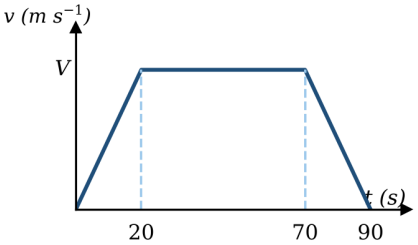
6 The diagram shows the curve y = f(x), a quadratic.
(a) Find the coordinates of the local maximum point of y = |f(x)|.
(b) How many solutions has |f(x)| = 3?



7 The mass M kg of a substance satisfies $\frac{dM}{dt} = -0.05M$, where t is in years.
Initially M = 100. Find M when t = 10, and the half-life, each to 3 s.f.

8 Given that $\sqrt{3}$ is irrational, prove by contradiction that $1 + 4\sqrt{3}$ is irrational.

9 A lift travels between floors in 90 s. The speed-time graph is a trapezium, with the maximum speed V m s^{-1} held from t = 20 to t = 70.
The floors are 840 m apart. Find V, and the deceleration in the final stage.



10 Solve $2\tan^2 x - 3\sec x - 7 = 0$ for $0 \leq x \leq 360°$,
giving answers to 1 d.p.