Day 16	A Level Maths: B Tier 10-a-day
1 The points A and B have coordinates $(-4, 6)$ and $(-1, -1)$. (a) Find the midpoint of AB. (b) Find the line AB as $ax + by + c = 0$, with integer a, b, c.	
2 Solve $\cos x = \frac{\sqrt{2}}{2}$ for $0 \leq x \leq 360°$.	
3 A train travelling at 8 m s^{-1} brakes and comes to rest with constant deceleration 4 m s^{-2}. Find (a) the distance travelled while braking, (b) the time taken to stop.	
4 A new car costs £18000. Its value falls by 15% each year. (a) Find its value after 6 years (nearest £). (b) In which year does it first fall below £5000?	
5 $f(x) = x^3 + 3x - 7$. Use the Newton-Raphson method with $x_0 = 1$ to find x_1 and x_2, to 4 d.p.	

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6 A is the point (7, −1) and B is the point (1, 6). Find the perpendicular bisector of AB as ax + by + c = 0, with integer a, b, c.

7 The time, X minutes, to complete a task is normally distributed with mean 150 and s.d. 8. A random sample of 16 is taken. Find the probability that the mean time is more than 154 (3 s.f.).

8 Particles A (2 kg) and B (3 kg) are joined by a light string over a smooth pulley. Both are held with the string taut, B is 4.5 m above the ground, then released.
Take g = 9.8 m s^{-2}.
Find the speed with which B hits the ground.

9 Solve 2 $\cot^2 x$ − 7 cosec x + 8 = 0 for 0 ≤ x ≤ 360°,
giving answers to 1 d.p.

10 The table summarises 32 measurements of m.
(a) Estimate the mean.
(b) Estimate the median using linear interpolation.

m (kg)	Frequency
$20 \le m < 30$	6
$30 \le m < 40$	4
$40 \le m < 50$	3
$50 \le m < 60$	13
$60 \le m < 70$	6