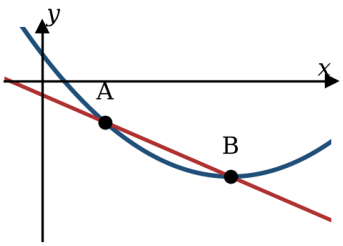
Day 217 **A Level Maths: A Tier 10-a-day**

1 The diagram shows the curve $y = x^2 - 6x + 2$ and the line $y = -2x - 1$, meeting at A and B.
(a) Find the coordinates of A and B.
(b) Find the coordinates of the midpoint of AB.

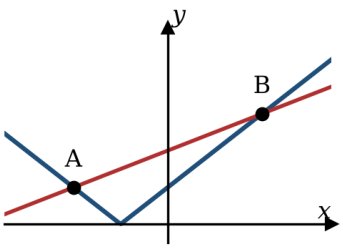


2 A club has 130 members: 60 Bronze, 30 Silver and 40 Gold.
A stratified sample of size 26 is taken.
Find the number of members sampled from each group.

3 A 10 kg box is pulled from rest along rough horizontal ground by a horizontal force of 15.8 N and moves 19.2 m in 8 s. Find (a) the coefficient of friction. The force is then removed; (b) find the further distance moved. Take g = 9.8. Give answers to 3 s.f. if not exact.

4 Given that $\log_a 2 = p$ and $\log_a 3 = q$, express $\log_a(24)$ in terms of p and q.

5 The diagram shows the graphs of $y = |2x + 3|$ and $y = x + 6$.
The graphs meet at A and B.
Find the coordinates of A and B.



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6 Solve the differential equation $y\frac{dy}{dx} = 4x$, given that $y = 3$ when $x = 0$ ($y > 0$). Give y in terms of x.	
7 The masses in grams of two groups: factory A has n = 13, mean 69, sd 6; factory B has n = 13, mean 57, sd 5. Find the mean and standard deviation of all 26 values (3 s.f. for the sd).	
8 A circle passes through A(11, −2) and B(7, −10). Its centre lies on the line $y = -x - 1$. Find the equation of the circle.	
9 Car A passes P at constant speed 4 m s^{-1}. 4 s later car B leaves P from rest, in the same direction, with acceleration 1.5 m s^{-2}. B overtakes A at Q. Find (a) the time B takes to reach Q, (b) PQ, (c) the speed of B at Q.	
10 A drink at 82°C is left in a room at 22°C. Its temperature θ °C satisfies $\frac{d\theta}{dt} = -k(\theta - 22)$. After 15 minutes the temperature is 62°C. Find k, then the time for it to reach 42°C, to 3 s.f.	