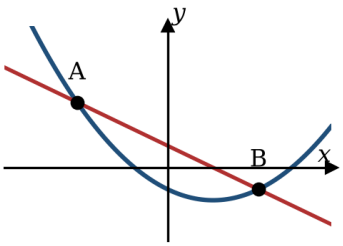
Day 119	A Level Maths: A Tier 10-a-day
1 Solve $\cos 2x + 4\cos x = 5$ for $0° \leq x \leq 360°$.	
2 A 6 kg particle rests on a rough plane inclined at α, $\tan\alpha = \frac{24}{7}$, $\mu = 0.2$. A force of P N acts up a line of greatest slope and the particle stays at rest. Find the range of values of P. Take g = 9.8. Give answers to 3 s.f. if not exact.	
3 A systematic sample is taken from a numbered list of 285 items. The 5th item chosen is number 72 and the 7th item chosen is number 102. Find the sampling interval, the number of the first item chosen and the size of the sample.	
4 A stone is dropped from rest from the top of a cliff. In the last 2 seconds before it hits the sea it falls 78.4 m. Find the height of the cliff. Take g = 9.8.	
5 $f(x) = 2 + 3\arccos(2x)$. Find the exact value of x for which $f(x) = \pi + 2$. Hence state the range of f.	

Day 119 **A Level Maths: A Tier 10-a-day**

6 Solve $x(\sqrt{7} - 3) = 5 + 4\sqrt{7}$, writing x in the form $p + q\sqrt{7}$.

7 The region bounded by the curve $y = e^{3x}$, the x-axis, $x = 0$ and $x = 1$ is rotated through 360° about the x-axis.
Find the exact volume of the solid formed.

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



9 A stratified sample of 80 students is taken from three groups.
5 of the sample are from Arts, which has 40 students.
(a) Find the total number of students.
(b) Science has 96 students. How many are sampled?

10 A circle touches both coordinate axes and passes through the point (−5, 10). Its centre lies in the second quadrant.
Find the equations of the two possible circles.