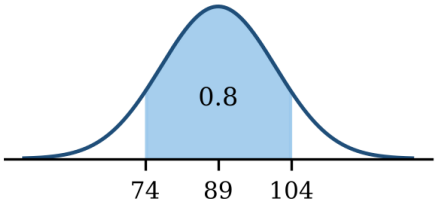
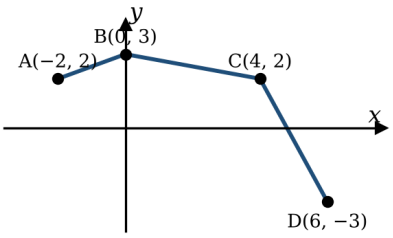
Day 359 **A Level Maths: S Tier 10-a-day**

1 The pdf of $X \sim N(89, \sigma^2)$ is shown; the shaded area is symmetrical.
(a) Find σ. (b) Find $P(X > 112)$.



2 The diagram shows $y = f(x)$, made of three straight line segments. Find the coordinates of the images of A, B, C and D on the graph of $y = 3f(-2x + 4)$.



3 A stone is thrown vertically upwards with speed 8 m s^{-1} from the top of a cliff. The top of the cliff is 46.4 m above the sea.
Find (a) the time taken for the stone to reach the sea, (b) the total distance travelled by the stone, to 3 s.f. Take $g = 9.8$ m s^{-2}.

4 Solve $5^{2x} - 6 \times 5^{x+1} + 125 = 0$,
giving each answer exactly and, where not an integer, to 3 s.f.

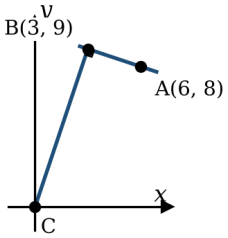
5 Solve $\sqrt{x + 9} = x + 7$.

Day 359	A Level Maths: S Tier 10-a-day

6 A particle of weight W N is on a rough plane inclined at α to the horizontal, where $\sin\alpha = \frac{12}{13}$. A force P N acts up a line of greatest slope; the particle stays at rest for $78 \leq P \leq 114$.
Find (a) W, (b) the coefficient of friction, (c) the acceleration when P = 228. Take g = 9.8 m s^{-2}.

7 The region bounded by $y = \sin x + \cos x$, the x-axis and the lines
$x = 0$ and $x = \pi/2$ is rotated through 2π about the x-axis.
Find the exact volume of the solid formed.

8 In the diagram, line l_1 passes through A and B. Line l_2 is perpendicular to l_1 at B and meets the x-axis at C. Find the coordinates of C and the area of triangle ABC.



9 Data satisfy $y = ab^x$. The line of best fit for lg y against x is $\lg y = 0.8 + 0.85x$.
(a) Find a and b to 3 significant figures.
(b) Estimate y when x = 15, to 3 significant figures.
(c) Interpret the value of b.

10 Line l_1: $\mathbf{r} = \begin{pmatrix} 0 \\ -5 \\ 7 \end{pmatrix} + s\begin{pmatrix} -1 \\ 2 \\ -2 \end{pmatrix}$,
line l_2: $\mathbf{r} = \begin{pmatrix} -5 \\ -2 \\ 2 \end{pmatrix} + t\begin{pmatrix} -3 \\ -1 \\ -3 \end{pmatrix}$.
Show whether the lines meet, giving the point of intersection if they do, and find the acute angle between them to 1 d.p.