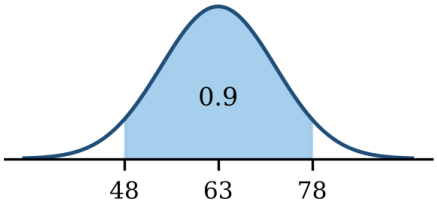
Day 156 **A Level Maths: S Tier 10-a-day**

1 The pdf of $X \sim N(63, \sigma^2)$ is shown; the shaded area is symmetrical.
(a) Find σ. (b) Find $P(X > 85)$.



2 $g(x) = x^2 - 2$. Also $fg(x) = -2x^2 - 2$, where f is a linear function. (a) Find f(x).
(b) Solve $gf(x) = 142$.

3 The curve $y = 2^x - 2x$ has one stationary point. Find its coordinates to 3 s.f. and show that it is a minimum.

4 For events A and B, $P(A) = 0.5$, $P(B) = 0.15$ and $P(A \mid B) = 0.3$.
(a) Find $P(A \cap B)$.
(b) Find $P(A \mid B')$.

5 A lift of mass M kg, carrying a passenger of mass 80 kg, hangs from a vertical cable. The tension in the cable is 3922 N and the floor exerts a force of 592 N on the passenger. Find (a) the acceleration of the lift, with its direction, (b) the value of M. Take $g = 9.8$ m s^{-2}.

Day 156	A Level Maths: S Tier 10-a-day
6 Express $\frac{-6-\sqrt{7}}{4-\sqrt{7}}$ in the form $p + q\sqrt{7}$, where p and q are rational numbers.	
7 The curve $y = x^2\sqrt{20-x}$, for $0 < x < 20$, has one stationary point. Find its exact coordinates and determine its nature.	
8 A ball is projected from a point O on horizontal ground at 18 m s^{-1}, at angle θ above the horizontal. It passes through the point P, 18 m horizontally and 5 m vertically from O. Find the two possible values of $\tan\theta$, and the two possible values of θ to 1 d.p. Take $g = 9.8$ m s^{-2}.	
9 P is a point on the curve $y^2 = x$. Find the exact minimum distance from P to the point (7, 0), and the x coordinate of P at which it occurs.	
10 $f(x) = \frac{kx+4}{x-3}$ for $x \neq 3$. Given that f is self-inverse, find k, and hence solve $f(x) = x$.	