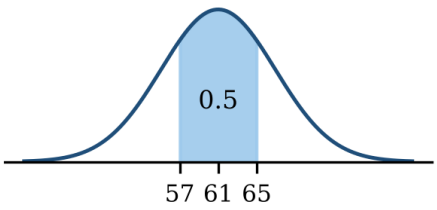
Day 21	A Level Maths: S Tier 10-a-day
1 The curve $y = 5^x - 4x$ has one stationary point. Find its coordinates to 3 s.f. and show that it is a minimum.	
2 Express $\frac{4 - 4\sqrt{5}}{1 - \sqrt{5}}$ in the form $p + q\sqrt{5}$, where p and q are rational numbers.	
3 A box of mass 15 kg is at rest on rough horizontal ground ($\mu = 0.1$). A horizontal force of 25.2 N acts on it for 7 s and is then removed. Find (a) the speed when the force is removed, (b) the total distance travelled before the box stops. Take $g = 9.8$ m s^{-2}.	
4 The pdf of $X \sim N(61, \sigma^2)$ is shown; the shaded area is symmetrical. (a) Find σ. (b) Find $P(X > 67)$. 	
5 A car of mass 1500 kg tows a trailer of mass 300 kg along a horizontal road, with driving force 1520 N. Resistances are 800 N on the car and 180 N on the trailer. (a) Find the tension in the tow bar. At 4.8 m s^{-1} the tow bar breaks. (b) Find the distance between car and trailer when the trailer stops.	

Day 21	A Level Maths: S Tier 10-a-day
6 The first row of a theatre has 19 seats. Each row has 3 more seats than the row in front. Find (a) the number of seats in row 53, (b) the least number of rows for at least 1184 seats.	
7 The curve $y = 3x^3\sqrt{7 - x}$, for $0 < x < 7$, has one stationary point. Find its exact coordinates and determine its nature.	
8 Use a suitable trigonometric identity to find the exact value of $\int_0^{\pi/4} \cos^4 2x \, dx$	
9 When a polynomial f(x) is divided by $(x + 2)$ the remainder is -11; when divided by $(x - 4)$ the remainder is 1. Find the remainder when f(x) is divided by $(x + 2)(x - 4)$.	
10 A biased coin lands on 'win' with the same unknown probability p each time. It is used 7 times in round 1 and 9 times in round 2. Given that exactly 4 wins occur altogether, find the probability that exactly 1 of them were in round 1.	