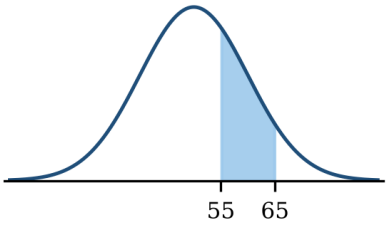
Day 256	A Level Maths: B Tier 10-a-day
1 Solve $2^x = 3^{x+1}$, giving your answer to 3 s.f.	
2 Find the quotient and the remainder when $-x^3 + 8x^2 - 8x - 5$ is divided by $(x - 2)$.	
3 Find (a) $\int 3\cos 4x \, dx$, (b) the exact value of $\int_0^{\frac{\pi}{8}} 3\cos 4x \, dx$.	
4 10 values of x are coded using $y = \frac{(x - 20)}{5}$. $\Sigma y = 18$ and $\Sigma y^2 = 212$. Find the mean and standard deviation of x (3 s.f.).	
5 Use the substitution $u = x^2 + 1$ to find the exact value of $\int_0^1 \frac{2x}{x^2 + 1} \, dx$.	

Day 256 **A Level Maths: B Tier 10-a-day**

6 A car of mass 1500 kg tows a trailer of mass 250 kg along a straight horizontal road by a light horizontal tow bar. The resistances are 300 N on the car and 150 N on the trailer. The engine's driving force is 3600 N. Find the acceleration and the tension in the tow bar.

7 $X \sim N(50, 10^2)$. The shaded area on the diagram represents the probability that X lies between two values.
Find this probability to 3 significant figures.



8 A ball is kicked from horizontal ground with speed 24.5 m s^{-1} at an angle θ above the horizontal, where $\tan\theta = \frac{4}{3}$.

Take g = 9.8 m s^{-2}.
Find (a) the time of flight, (b) the horizontal range.

9 Solve the equation $5^{2x} - 3\times5^{x} - 10 = 0$.

10 The points A and B have coordinates $(-1, 0)$ and $(2, -3)$.
(a) Find the midpoint of AB.
(b) Find the line AB as ax + by + c = 0, with integer a, b, c.