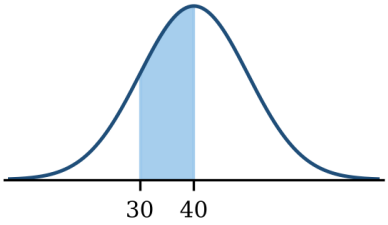
Day 164 **A Level Maths: B Tier 10-a-day**

1 A particle moves in a straight line. At time t s its velocity is $v = 3t - 1.5t^2$ m s^{-1}, for $t \geq 0$.
Find the maximum speed of the particle and the time at which it occurs.

2 $X \sim N(40, 10^2)$. The shaded area on the diagram represents the probability that X lies between two values.
Find this probability to 3 significant figures.

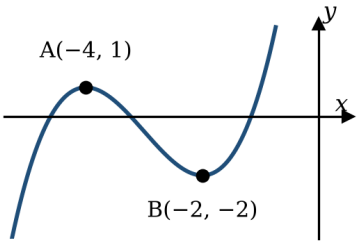


3 Solve $\sin(x + 0.5) = 0.8$ for $0 \leq x \leq 2\pi$, giving answers to 3 significant figures.

4 A package is thrown horizontally at 29 m s^{-1} from the top of a building 78.4 m above level ground.
Take g = 9.8 m s^{-2}.
Find the time of flight and the horizontal distance from the base where it lands.

5 The diagram shows the curve y = f(x). A and B are the turning points. Find the turning points of:

(a) $y = -f(x)$ (b) $y = f(\frac{x}{2})$



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6 The region R is bounded by the curve $y = x^2 + 3$, the x-axis and the lines $x = 0$ and $x = 2$. R is rotated through 360° about the x-axis. Find the exact volume generated.	
7 Find the coefficient of x^3 in the expansion of $(3 + x)(1 + 2x)^4$.	
8 Use integration by parts to find the exact value of $\int_0^{\frac{\pi}{4}} x \cos 2x \, dx$.	
9 The time, X minutes, to complete a task is normally distributed with mean 50 and s.d. 10. A random sample of 4 is taken. Find the probability that the mean time is more than 54 (3 s.f.).	
10 Find the sum of all the multiples of 12 that lie between 95 and 317.	