Day 193 **A Level Maths: B Tier 10-a-day**

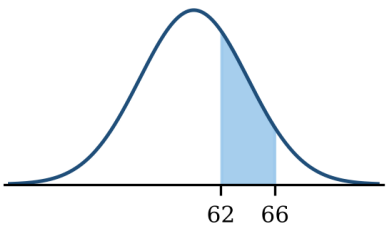
1 Regression line (x from 1 to 9): $y = 12 + 25x$.
x is the hours of sunshine, y the number of ice creams sold.
(a) Interpret the gradient.
(b) Estimate y when x = 2 and comment.

2 (a) Write $x^2 - 10x + 34$ in the form $a(x + p)^2 + q$.
(b) Write down the coordinates of the minimum point of $y = x^2 - 10x + 34$.

3 Differentiate y = tan x with respect to x,
and find the exact gradient when $x = \frac{\pi}{4}$.

4 The points A, B and C are (3, −7), (0, −3) and (−8, −9).
(a) Show that angle ABC = 90°.
(b) Find the area of triangle ABC.

5 $X \sim N(60, 4^2)$. The shaded area on the diagram represents the probability that X lies between two values.
Find this probability to 3 significant figures.



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6 Solve $\frac{dy}{dx} = (5 + y)e^{-x}$, given that $y = 3$ when $x = 0$.	
7 Particles A (2 kg) and B (8 kg) are joined by a light string over a smooth pulley. Both are held with the string taut, B is 6 m above the ground, then released. Take $g = 9.8$ m s^{-2}. Find the speed with which B hits the ground.	
8 The radius of a circular oil slick increases at 0.5 cm per second. Find the rate at which its area is increasing when $r = 5$ cm, in terms of π.	
9 A marble is projected vertically upwards with speed 26 m s^{-1} from ground level. Take $g = 9.8$ m s^{-2}. Find, to 3 significant figures, (a) the greatest height reached, (b) the time of flight.	
10 (a) Expand $(1 + 3x)^{-2}$ up to the x^2 term. (b) Use $x = 0.01$ to estimate $\frac{1}{1.03^2}$ to 5 decimal places.	