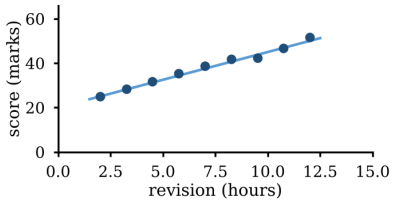
Day 352	A Level Maths: A Tier 10-a-day
1 Find the exact value of $\int_0^1 (2x - 1)^4 \, dx$.	
2 Find the sum of all the multiples of 6 that lie strictly between 132 and 420.	
3 $y = \cos^2(2x)$. Find $\frac{dy}{dx}$ and its exact value at $x = \frac{\pi}{8}$.	
4 A crate of mass 8 kg is pushed at constant speed along rough horizontal ground, $\mu = 0.3$, by a force of P N at angle θ below the horizontal, $\tan\theta = \frac{12}{5}$. Find P and the normal reaction. Take $g = 9.8$.	
5 The line $-3x + 4y = k$ is a tangent to the circle $(x + 1)^2 + (y - 3)^2 = 36$. Find the two possible values of k.	

Day 352 **A Level Maths: A Tier 10-a-day**

6 The diagram shows data and the regression line $y = 20 + 2.5x$.
(a) Interpret the gradient.
(b) Estimate y when x = 11 and comment.



7 Solve $\text{cosec}^2 x - 4\cot x + 2 = 0$
for $0° < x < 360°$. Give answers to 1 d.p.

8 Prove by contradiction that $\sqrt{3}$ is irrational.

9 A particle P has position vector $\mathbf{r} = (t^3 + 6t)\mathbf{i} + (t^2 - 6t)\mathbf{j}$ metres at time t s. Find (a) the speed of P when t = 2, (b) the value of t when P is moving parallel to $\mathbf{i}$. Give answers to 3 s.f. if not exact.

10 A bag has 5 black and 3 white counters. Two are taken at random without replacement. Given that the second counter is black, find the probability that the first was black.