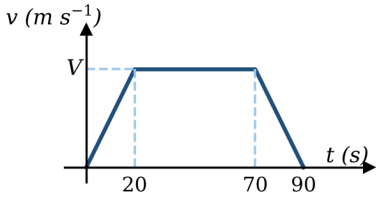
Day 40 **A Level Maths: A Tier 10-a-day**

1 The diagram shows the speed-time graph for a train journey of 560 m. Find (a) V, (b) the deceleration in the final stage.

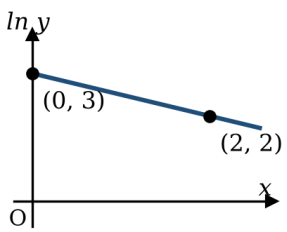


2 P(A) = 0.6, P(B) = 0.55 and P(A ∩ B) = 0.5.
Find
(a) P(A ∪ B)
(b) P(A | B′)
(c) P(B′ | A′)

3 $y = (-2x - 2)^{-2}$.
Find $\frac{dy}{dx}$ and the gradient of the curve at x = 1.

4 Find the coefficient of x^3 in the expansion of $(1 - 2x)^7$.

5 The diagram shows the graph of ln y against x for $y = A e^{kx}$.
Find the exact values of A and k.



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6 Show that $\frac{3}{\sqrt{11}-3}+\frac{4}{\sqrt{11}+3}$ can be written as $p+q\sqrt{11}$, and find p and q.	
7 Ball A is dropped from rest 88.2 m above the ground. At the same instant ball B is projected upwards at 44.1 m s^{-1} from the ground directly below A. Find (a) the time when they collide, (b) the height of the collision. Take g = 9.8.	
8 The line $y = k - x$ is a tangent to the curve $y = \frac{16}{x}$. Find the possible values of k.	
9 Water drains from a tank so that the depth h metres falls at a rate proportional to $\sqrt{h}$. Initially h = 36, and after 3 hours h = 1. Form and solve a differential equation to find how long, in total, the tank takes to empty.	
10 The times in seconds of two groups: group X has n = 20, mean 50, sd 7; group Y has n = 20, mean 44, sd 8. Find the mean and standard deviation of all 40 values (3 s.f. for the sd).	