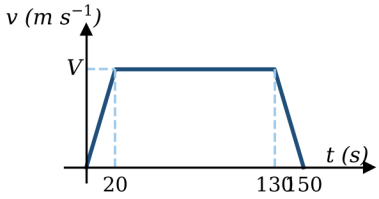
Day 59 **A Level Maths: A Tier 10-a-day**

1 Simplify fully $\frac{9x^2 - 25}{3x^2 - 17x + 20}$.

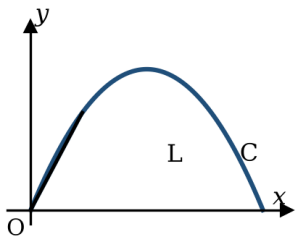
2 $|a| = 5$, $|b| = 2$ and the angle between a and b is 150°.
Find the exact values of $a \cdot b$ and $|a + b|$.

3 A(−13, −8) and B(11, 2) are the ends of a diameter of a circle.
(a) Find the equation of the circle, in the form $x^2 + y^2 + ax + by + c = 0$.
(b) Show that C(4, −15) lies on the circle.

4 The diagram shows the speed-time graph for a train journey of 3120 m. Find (a) V, (b) the deceleration in the final stage.



5 The diagram shows the curve C: $y = x(9 - x)$ and the line L: $y = 7x$.
Find the area of the shaded region between C and L.



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6 20 values have $\Sigma x = 820$ and $\Sigma x^2 = 33800$. One value was recorded as 45 but should have been 44. Find the correct mean and standard deviation (3 s.f.).	
7 A curve has equation $2x^2 + 2xy + 2y^2 = 6$. Find the coordinates of the points where the tangent is parallel to the x-axis.	
8 $f(x) = \frac{2x - 3}{x - 5}$, $x \in \mathbb{R}$, $x \neq 5$. Find $f^{-1}(x)$ and state its domain.	
9 $X \sim B(25, p)$. H_0: $p = 0.4$ is tested against H_1: $p > 0.4$ using a 5% significance level. (a) Find the critical region. (b) State the probability of a Type I error. (c) Find the probability of a Type II error when $p = 0.5$ (3 s.f.).	
10 A uniform ladder AB (10 m, 30 kg) rests with A on rough ground, $\mu = 0.3$, and B against a smooth wall, B being 8 m above the ground. A man of mass 75 kg climbs the ladder. How far along the ladder from A can he climb before it slips?	