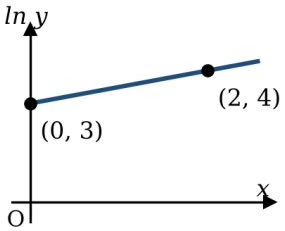
Day 184	A Level Maths: A Tier 10-a-day
1 Summary statistics for the daily mean temperature (°C) in the same month are: Camborne: mean 15.5, standard deviation 5.8; Leeming: mean 17.5, standard deviation 1.1. Make two comparisons.	
2 Particles A (7 kg) and B (5 kg) move towards each other on a smooth horizontal line at 9 m s^{-1} and 6 m s^{-1}. They collide and coalesce. Find (a) the speed of the combined particle, (b) the kinetic energy lost in the collision. Give answers to 3 s.f. if not exact.	
3 Solve $3^{3x-2} = 7^{2x+2}$. Give your answer to 3 significant figures.	
4 The line $y = -2x + 4$ meets the curve $y = x^2 - 5x + 6$ at A and B. (a) Find the coordinates of A and B. (b) Find the exact length AB.	
5 $P(A) = 0.1$ and $P(A \cup B) = 0.73$. (a) Given that A and B are independent, find P(B). (b) Given instead that A and B are mutually exclusive, find P(B). (c) In the case in (a), find $P(A' \cap B)$.	

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6 At 12:00 ship P has position $(14\mathbf{i} - 8\mathbf{j})$ km and velocity $(-3\mathbf{i} + \mathbf{j})$ km h^{-1}; ship Q has position $(-2\mathbf{i} - 20\mathbf{j})$ km and velocity $(\mathbf{i} + 4\mathbf{j})$ km h^{-1}.
Show that the ships collide and find the time and position vector of the collision.

7 The diagram shows the graph of ln y against x for $y = A\,b^x$.
Find the exact values of A and b.



8 $f(x) = \dfrac{4x - 3}{(1 - 2x)(1 - x)}$.
(a) Express f(x) in partial fractions.
(b) Hence expand f(x) up to x^2.
(c) State the range of x for which the expansion is valid.

9 Expand $(1 + x)^{-1}$ in ascending powers of x up to and including the term in x^2.
State the range of values of x for which the expansion is valid.

10 The volume of a cube of edge x cm is increasing at 48 $cm^3 s^{-1}$.
Find the rate of increase of its total surface area when x = 3.