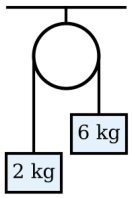
Day 359	A Level Maths: B Tier 10-a-day
1 For 12 pairs of data, $S_{xx} = 80$, $S_{yy} = 125$ and $S_{xy} = 63$. Find the PMCC (3 s.f.) and describe the correlation.	
2 Find the exact value of $\int_1^2 (6e^{-2x} + \frac{2}{x})\, dx$.	
3 X ~ Po(4.5), modelling the number of flaws per metre of cloth. Find, to 3 significant figures, (a) $P(X \leq 6)$ (b) $P(X \geq 6)$	
4 $f(x) = 2x^2 - 8x + 16$ for $x \geq 2$. Find $f^{-1}(x)$ and state its domain.	
5 A woman of mass 70 kg stands on weighing scales in a lift. The lift decelerates at 0.5 m s^{-2} while moving upwards. Take g = 9.8 m s^{-2}. Find the force exerted on the woman by the scales.	

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6 A has position vector $\begin{pmatrix} 1 \\ -5 \\ -3 \end{pmatrix}$ and B has position vector $\begin{pmatrix} -11 \\ 3 \\ 1 \end{pmatrix}$.
The point P lies on AB with AP : PB = 1 : 3.
Find the position vector of P.

7 The curve C has equation $y = x^2 - 4x - 2$.
C is stretched by scale factor 3 parallel to the y-axis.
Find its new equation.

8 Particles of mass 2 kg and 6 kg hang on a light string over a smooth fixed pulley, as shown, and are released from rest. Take $g = 9.8$ m s^{-2}.
Find the acceleration and the tension in the string.



9 The area of a square increases at a constant rate of 12 cm^{2}s^{-1}.
Find the rate of increase of the side length when the side is 5 cm.

10 $f(x) = 3x^3 + px^2 + qx - 3$.
When f(x) is divided by $(x - 3)$ the remainder is 60, and when divided by $(x - 2)$ the remainder is 11. Find p and q.