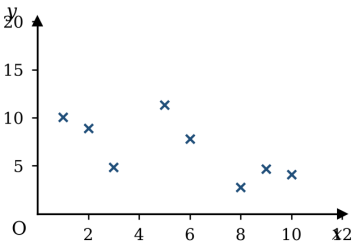
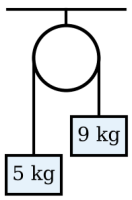
Day 64 **A Level Maths: B Tier 10-a-day**

1 The first term of an arithmetic series is 11 and the common difference is 7.
The sum of the first n terms is 900. Find the value of n.

2 The scatter diagram shows eight pairs of values of x and y.
(a) Describe the correlation.
(b) Why should $y = 12 - x$ not be used for $x = 20$?

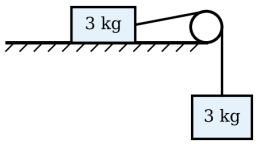


3 Particles of mass 5 kg and 9 kg hang on a light string over a smooth fixed pulley, as shown, and are released from rest. Take $g = 9.8$ m s^{-2}.
Find the acceleration and the tension in the string.



4 For 10 pairs of values, $\bar{x} = 12$, $\bar{y} = 40$, $S_{xx} = 20$ and $S_{xy} = -30$.
(a) Find the regression line of y on x in the form $y = a + bx$.
(b) Estimate y when $x = 14$.

5 A is the point $(1, -2)$ and B is the point $(-3, 5)$.
Find the perpendicular bisector of AB as $ax + by + c = 0$, with integer a, b, c.

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6 Find the coordinates of the stationary point of the curve $y = e^{2x} - 2e^{x}$, and determine its nature.	
7 Find the set of values of x for which $4x \leq -2$ and $x^2 - 2x - 35 \geq 0$.	
8 A block of mass 3 kg lies on a rough horizontal table (coefficient of friction 0.4). It is joined by a light string over a smooth pulley to a particle of mass 3 kg hanging freely. Take $g = 9.8$ m s^{-2}. The system is released. Find the acceleration and the tension in the string. 	
9 A chord AB subtends an angle of 1.9 radians at the centre O of a circle of radius 8 cm. Find the perimeter of the minor segment, to 3 s.f.	
10 A closed cylinder has radius r cm and volume 250π cm^3. Show that its surface area is $S = 2\pi r^2 + \frac{500\pi}{r}$, and find the minimum S.	