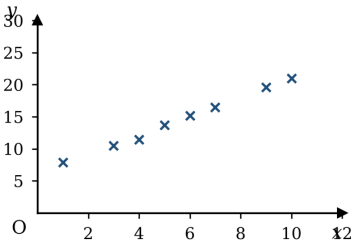
Day 278	A Level Maths: B Tier 10-a-day

1 A train travelling at 24 m s^{-1} brakes and comes to rest with constant deceleration 1.25 m s^{-2}.
Find (a) the distance travelled while braking, (b) the time taken to stop.

2 The curve C has equation $y = \ln(2x - 1) + 3 - x$.
Find the equation of the normal to C at the point where $x = 1$, in the form $y = mx + c$.

3 The scatter diagram shows eight pairs of values of x and y.
(a) Describe the correlation.
(b) Why should $y = 6 + 1.5x$ not be used for $x = 14$?



4 An arithmetic sequence has 3rd term 19 and 5th term 23.
(a) Find the first term and the common difference.
(b) Find the sum of the first 30 terms.

5 A sledge of mass 5 kg is pulled across smooth horizontal ice by a rope with tension 39 N, inclined at α above the horizontal, where $\tan\alpha = \frac{12}{5}$.
Take g = 9.8 m s^{-2}.
Find (a) the acceleration of the sledge, (b) the normal reaction of the ice.

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6 The line l has equation $y = 2x - 2$. The point P is $(4, -4)$.
(a) Find the line through P perpendicular to l, as $ax + by + c = 0$ with integer a, b, c.
(b) Find the foot F and the exact distance PF.

7 Given that each trap catches a rabbit independently with probability 0.2, find the least number of traps needed for the probability of at least one success to exceed 0.95.

8 Solve $3^x < 396$, giving your answer to 3 s.f.

9 The line $4x + 3y = k$ is a tangent to the circle $(x - 3)^2 + (y + 2)^2 = 25$.
Find the two possible values of k.

10 The shaded region is the segment cut off by the chord AB of a circle with centre O and radius 10 cm. Angle AOB = 0.8 radians.
Find the area of the segment, to 3 s.f.

