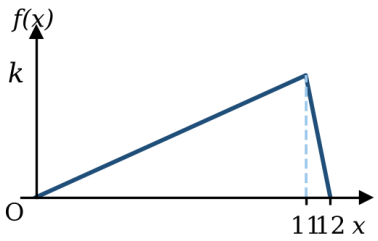
Day 74	A Level Maths: S Tier 10-a-day
1 Each battery is faulty with probability 0.03, independently. Find the least number n of batterys that must be tested so that the probability of finding at least one faulty is greater than 0.995.	
2 Solve $\cos 2\theta + 3\cos\theta - 1 = 0$ for $0 \leq \theta < 360°$.	
3 A stone is thrown vertically upwards with speed 15 m s^{-1} from the top of a cliff. The top of the cliff is 47.5 m above the sea. Find (a) the time taken for the stone to reach the sea, (b) the total distance travelled by the stone, to 3 s.f. Take g = 9.8 m s^{-2}.	
4 $f(x) = \frac{18x + 7}{(1 + 2x)(1 + 3x)}$. (a) Express f(x) in partial fractions. (b) Hence expand f(x) in ascending powers of x up to x^3, stating the range of validity.	
5 A ladder of length 17 m leans against a vertical wall. Its foot slides away from the wall at 2 m s^{-1}. When the foot is 8 m from the wall, find the rate at which the top is moving down.	

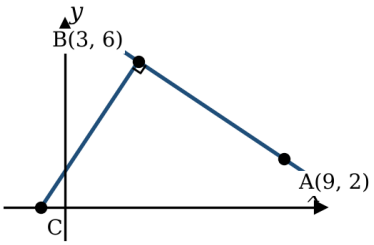
Day 74 **A Level Maths: S Tier 10-a-day**

6 The diagram shows the pdf of X.
Find (a) k, (b) E(X), (c) the median of X (3 s.f.).



7 The points A, B, C have coordinates (−3, 3, 1), (−3, 5, 5), (5, 2, 0).
Find angle ABC to 1 d.p., and the exact area of triangle ABC.

8 In the diagram, line l_1 passes through A and B. Line l_2 is perpendicular to l_1 at B and meets the x-axis at C. Find the coordinates of C and the area of triangle ABC.



9 A car of mass 1000 kg, with engine power 17.3 kW, climbs a straight road with $\sin\alpha = \frac{1}{25}$ against a constant resistance of 300 N.
Find (a) the greatest steady speed up the hill, (b) the acceleration at $\frac{25}{3}$ m s^{-1}. Take g = 9.8 m s^{-2}.

10 The curve C has equation $y = \frac{-2x + 12}{x + 2}$.
(a) Write down the equations of the asymptotes of C.
(b) The line y = −x + k is a tangent to C.
Find the possible values of k.