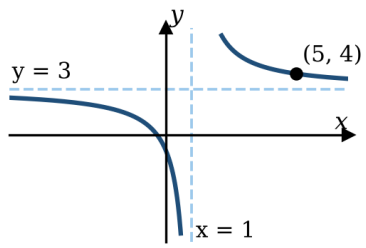
Day 364	A Level Maths: A Tier 10-a-day
1 Solve $2\cos^2 x - \sin x + 1 = 0$ for $0° \leq x \leq 180°$.	
2 Express $\frac{-7x - 7}{(x - 2)(x + 5)}$ in partial fractions.	
3 Find the smallest positive integer n such that $(\frac{9}{10})^n < 0.02$.	
4 A stone is projected vertically upwards from the ground. It passes a ledge 3 s after projection and again 7 s after projection. Find (a) the speed of projection, (b) the height of the ledge, (c) the greatest height. Take g = 9.8.	
5 A bag has 7 green and 5 yellow counters. Two are taken at random without replacement. Given that the counters are the same colour, find the probability they are both green.	

Day 364 **A Level Maths: A Tier 10-a-day**

6 Use the substitution u = x + 3 to find the exact value of

$$\int_0^{13} \frac{x}{\sqrt{x+3}}\,dx.$$

7 The diagram shows the curve $y = \frac{k}{x-a} + b$ with asymptotes as shown. Find the values of k, a and b, and the coordinates where the curve crosses the axes.



8 A particle P moves on the x-axis with velocity v = $(6t^2 - 30t + 36)$ m s^{-1} at time t s, $t \geq 0$, and starts at O. Find (a) the times when P is at instantaneous rest, (b) the total distance P travels in the first 5 s.

9 Find the set of values of k for which the line y = 4x + k does not meet the curve $y = 2x^2 + 4x - 3$.

10 0.5% of people have a disease. The screening test is positive for 98% of those who have it and for 2% of those who do not.
(a) Find the probability that a person tests positive.
(b) Given a positive test, find the probability that the person has the disease (3 s.f.).