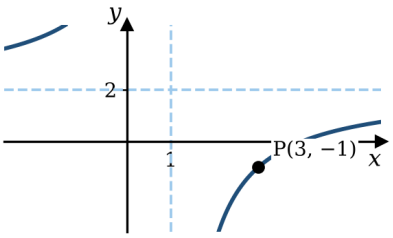
Day 288	A Level Maths: S Tier 10-a-day
1 A river is 150 m wide and flows at 17 m s^{-1}. A boat has speed 8 m s^{-1} in still water and crosses the river heading so that it is carried as little distance downstream as possible. Find the least possible distance downstream between the starting point and the landing point.	
2 The curve $y = 2x\sqrt{3 - x}$, for $0 < x < 3$, has one stationary point. Find its exact coordinates and determine its nature.	
3 Solve $x^3 - 3x - 2 > 0$.	
4 Solve the simultaneous equations $\lg x - \lg y = 2$ $x + y = 101$	
5 Each bulb is faulty with probability 0.05, independently. Find the least number n of bulbs that must be tested so that the probability of finding at least one faulty is greater than 0.9.	

Day 288 **A Level Maths: S Tier 10-a-day**

6 Particles of mass 12 kg and 8 kg hang on a light string over a smooth fixed pulley. The 12 kg particle is 1.5 m above the ground; the 8 kg one is on the ground.
Released from rest, find (a) the tension, (b) the greatest height reached by the 8 kg particle.
Take g = 9.8 m s^{-2}.

7 The diagram shows the curve C, its asymptotes (dashed) and a point P. C has equation $y = \frac{a}{x + p} + q$. Find a, p and q.



8 Use a suitable trigonometric identity to find the exact value of

$$\int_0^{\pi/3} \sin 5x \cos x \, dx$$

9 Find the term independent of x in the expansion of $(3x - \frac{3}{x^2})^6$.

10 The pdf of $X \sim N(95, \sigma^2)$ is shown; the shaded area is symmetrical.
(a) Find σ. (b) Find P(X > 109).

