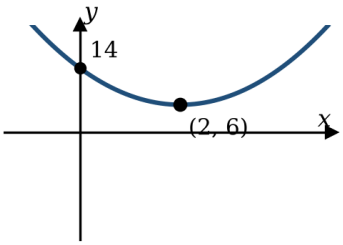
Day 13 **A Level Maths: A Tier 10-a-day**

1 0.5% of people have a disease. The screening test is positive for 80% of those who have it and for 5% 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.).

2 By writing 15° as 45° − 30°, find the exact value of

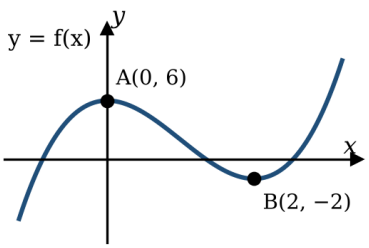
sin 15°, in the form $\frac{\sqrt{a} \pm \sqrt{b}}{c}$.

3 The diagram shows the curve with equation y = f(x), where f is a quadratic.
The turning point is marked, and the curve crosses the y-axis as shown.
Find f(x), giving it in the form $ax^2 + bx + c$.



4 Particle A (1 kg) lies on a rough table, μ = 0.25, joined by a light string over a smooth pulley to particle B (7 kg), 1.2 m above the floor. Released from rest; B lands without rebounding. Find (a) the acceleration of A before B lands, (b) the further distance A moves. Take g = 9.8. Give answers to 3 s.f. if not exact.

5 The diagram shows the curve y = f(x), with turning points A and B.
Find the coordinates of the turning points of
(a) y = 2f(x) (b) y = f(x) − 3



Day 13	A Level Maths: A Tier 10-a-day

6 A particle moves in a straight line with velocity v = $(-3t^2 + 12t)$ m s^{-1} at time t s, $t \geq 0$, starting at O. Find (a) its greatest speed, (b) its distance from O when t = 4, (c) the time at which it returns to O.

7 The line l has equation $\mathbf{r} = \begin{pmatrix} -2 \\ 7 \\ 7 \end{pmatrix} + t\begin{pmatrix} 2 \\ -2 \\ -2 \end{pmatrix}$.
Find the coordinates of the foot of the perpendicular from P(5, 4, 5) to l, and the exact distance from P to l.

8 $X \sim N(73, 4^2)$. Find $P(X > 81 \mid X > 75)$ to 3 significant figures.

9 A circle touches both coordinate axes and passes through the point $(9, -8)$. Its centre lies in the fourth quadrant.
Find the equations of the two possible circles.

10 The diagram shows the curve $y = x(x - 1)(x - 2)$.
Find the total area of the two shaded regions.

