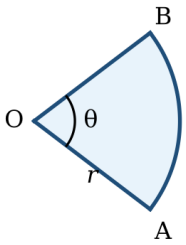
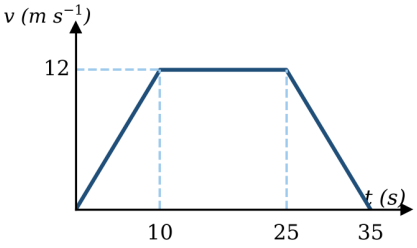
Day 107 **A Level Maths: B Tier 10-a-day**

1 The diagram shows a sector OAB of a circle with centre O, radius 8 cm and angle 0.7 radians.
Find (a) the arc length AB, (b) the area of the sector.



2 The points A and B have coordinates $(-4, -1)$ and $(1, -2)$.
(a) Find the midpoint of AB.
(b) Find the line AB as $ax + by + c = 0$, with integer a, b, c.

3 The diagram shows the speed-time graph of a train between two stations.
Find (a) the acceleration in the first 10 s, (b) the distance between the stations.

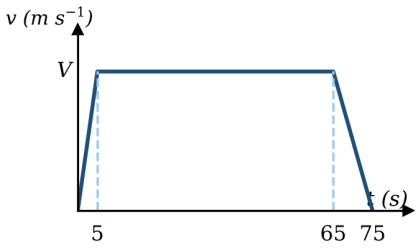


4 Simplify $\frac{(4x^3)^3 \times 6x^3}{8x^6}$.

5 Express $3\cos\theta + 4\sin\theta$ in the form $R\cos(\theta - \alpha)$, where $R > 0$ and $0 < \alpha < 90°$. Give α to 1 d.p.

Day 107 **A Level Maths: B Tier 10-a-day**

6 A lift travels between floors in 75 s. The speed-time graph is a trapezium, with the maximum speed V m s^{-1} held from t = 5 to t = 65.
The floors are 405 m apart. Find V, and the deceleration in the final stage.



7 X ~ B(20, p). H_0: p = 0.25 is to be tested against H_1: p < 0.25 at the 5% significance level.
Find the critical region and the actual significance level.

8 A curve has parametric equations $x = -t + 3$, $y = -t^2 - 5t - 3$.
The line $y = 2x - 9$ meets the curve at two points.
Find the coordinates of these points.

9 Given that $\sin A = \frac{24}{25}$ and $\sin B = \frac{9}{41}$, where A and B are acute,
find the exact value of sin(A + B).

10 Given that each lottery ticket wins a prize independently with probability 0.4, find the least number of tickets needed for the probability of at least one success to exceed 0.95.