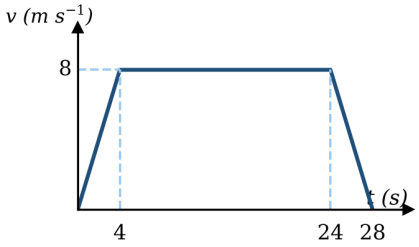
Day 57	A Level Maths: B Tier 10-a-day
1 Simplify $\frac{1 - \cos 2x}{1 + \cos 2x}$, giving your answer as a single trigonometric term.	
2 The diagram shows the speed-time graph of a train between two stations. Find (a) the acceleration in the first 4 s, (b) the distance between the stations. 	
3 Evaluate $32^{\frac{3}{5}}$.	
4 X has a binomial distribution with mean 9 and variance 6.3. (a) Find n and p. (b) Find P(X = 9) to 3 significant figures.	
5 A circle passes through A(−6, 8) and B(2, −4), and its centre lies on the x-axis. Find the centre and the equation of the circle.	

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6 For small θ (in radians), find an approximation of the form $1 + p\theta + q\theta^2$ for $\sin 3\theta + \cos 4\theta + \tan \theta$.	
7 The continuous random variable X has pdf $f(x) = kx^2$ for $0 \leq x \leq 3$, and 0 otherwise. (a) Find the value of k. (b) Find $P(X > 2)$. (c) Find $E(X)$.	
8 A cup of tea cools in a room at 15°C: $\frac{dT}{dt} = -k(T - 15)$. Initially $T = 95$ and after 6 minutes $T = 55$. Find k to 3 s.f. and the time to cool to 25°C, to 3 s.f.	
9 Solve the equation $2^{2x} + 2^x - 6 = 0$.	
10 A cricket ball is projected from ground level with initial velocity components 7 m s^{-1} horizontally and 29.4 m s^{-1} vertically upwards. Take $g = 9.8$ m s^{-2}. Find (a) the greatest height, (b) the speed at the greatest height.	