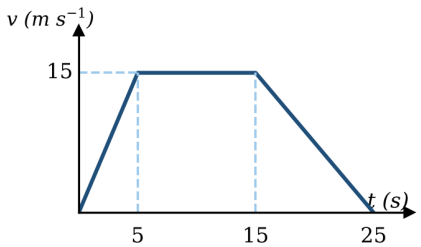
Day 362	A Level Maths: B Tier 10-a-day
1 A ball is thrown horizontally at 19 m s^{-1} from the top of a building 4.9 m above level ground. Take g = 9.8 m s^{-2}. Find the time of flight and the horizontal distance from the base where it lands.	
2 The curve C has equation $y = x^3 - x^2 - 2x - 1$. C is reflected in the y-axis. Find its new equation.	
3 Use the trapezium rule with 5 strips to estimate $\int_0^1 \cos(x^2)\,dx$, giving your answer to 3 significant figures.	
4 Large data set: mean pressure (hPa) at Camborne has mean 1011, sd 5. Outliers are more than 2 sd from the mean. Are the values 1020 and 999 outliers?	
5 The diagram shows the speed-time graph of a train between two stations. Find (a) the acceleration in the first 5 s, (b) the distance between the stations. 	

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6 A circle has equation $x^2 + y^2 - 12x - 2y + 29 = 0$. Find the coordinates of its centre and its radius.	
7 (a) Write $\frac{2x + 8}{(x + 3)(x + 5)}$ in partial fractions. (b) Hence evaluate $\int_0^4 \frac{2x + 8}{(x + 3)(x + 5)}\,dx$, giving the answer as a single logarithm.	
8 Data are modelled by $y = ab^x$, where a and b are constants. A plot of $\log_{10} y$ against x is a straight line with intercept 0.602 and gradient 0.699. Find a and b to 2 significant figures.	
9 Line l_1: $\mathbf{r} = \begin{pmatrix} -2 \\ 1 \\ -2 \end{pmatrix} + \lambda \begin{pmatrix} 3 \\ 2 \\ 3 \end{pmatrix}$. Line l_2: $\mathbf{r} = \begin{pmatrix} 0 \\ 5 \\ 1 \end{pmatrix} + \mu \begin{pmatrix} 1 \\ -2 \\ 0 \end{pmatrix}$. Show that l_1 and l_2 intersect and find the point.	
10 The line $y = x + 8$ meets the circle $(x + 2)^2 + (y + 1)^2 = 25$ at the points A and B. Find the coordinates of A and B, and the exact length of the chord AB.	