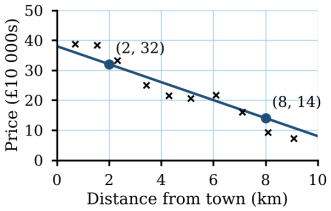
Day 244 **S Tier 10-a-day**

1 15 machines can make a batch of bolts in 20 hours.
After 2 hours, 5 of the machines leave. The rest carry on working at the same rate.
How many more hours does it take to finish?

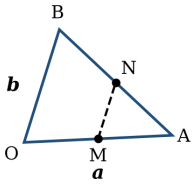
2 A sector of a circle has radius 5 cm and angle 270°.
(a) Work out the length of the arc of the sector.
(b) Work out the area of the sector. Give each answer in terms of π.

3 The scatter graph shows distance from town (x) and price (y).
The equation of the line of best fit is $y = -3x + 38$.
(a) Estimate y when x = 7.
(b) Explain why an estimate of y when x = 15 may be unreliable.



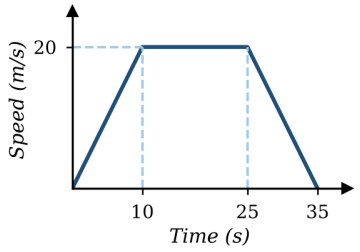
4 (a) Write $x^2 - 2x - 3$ in the form $(x + p)^2 + q$
(b) Write down the coordinates of the turning point of the curve $y = x^2 - 2x - 3$

5 OAB is a triangle. OA = **a** and OB = **b**.
M is on OA with OM : MA = 1 : 1. N is on AB with AN : NB = 1 : 1.
(a) Find ON in terms of **a** and **b**.
(b) Show that MN is parallel to OB.
The diagram is not drawn accurately.



Day 244 **S Tier 10-a-day**

6 The graph shows the speed of a train between two stations.
(a) Work out the acceleration in the first 10 seconds.
(b) Work out the total distance.



7 A solid cylinder of radius 6 cm and height 11 cm is melted down.
The metal is used to make identical solid spheres of radius 3 cm.
Work out the number of spheres that can be made.

The volume of a sphere of radius r is $\frac{4}{3}\pi r^3$.

8 Given that $(a + \sqrt{7})^2 = 88 + 18\sqrt{7}$,
where a is a positive integer, find the value of a.

9 $f(x) = \frac{3x - 1}{x - 3}$ where $x \neq 3$
(a) Show that $ff(x) = x$.
(b) Write down $f^{-1}(x)$.

10 Show that $\sqrt{10 + 4\sqrt{6}} = 2 + \sqrt{6}$