Day 271	S Tier 10-a-day

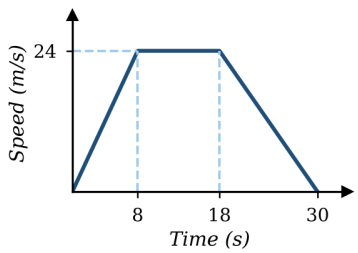
1 Work out the value of $xyz - x^2$
when $x = -1$, $y = -1$ and $z = -2$.

2 60 beetles in a field are caught, marked and put back.
Later, a second sample of 100 beetles is caught. 4 of these are marked.
(a) Work out an estimate for the number of beetles in a field.
(b) State one assumption you have made.

3 Solve $\frac{x-4}{6} + \frac{x-4}{2} = -2$

4 Triangle P has vertices A(0, 1), B(−1, 3) and C(1, 2).
Triangle Q has vertices A'(3, −2), B'(5, −6) and C'(1, −4).
Q is an enlargement of P.
Describe fully the single transformation that maps P onto Q.

5 The graph shows the speed of a cyclist during a journey.
(a) Work out the deceleration in the last 12 seconds.
(b) Work out the average speed over the whole journey.



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6 Light travels at 3×10^8 metres per second.
A planet is 9×10^{11} metres from a spacecraft.
How many seconds does a light signal take to travel from the planet to the spacecraft?
Give your answer in standard form.

7 A walker leaves a camp P and travels 100 km on a bearing of 265° to Q. (Calculator)
It then travels 44 km on a bearing of 315° to R.
(a) Work out the distance PR.
(b) Work out the bearing of R from P.
Give distances to 1 decimal place and the bearing to the nearest degree.

8 Tom invests £1,000 in an account paying compound interest.
The interest rate is the same percentage each year.
After 3 years the account holds £3,375.
Work out the annual percentage interest rate.

9 The table gives information about the masses of some eggs.
An estimate for the mean is 40.
Work out the value of x.

Mass, m (g)	Frequency
$0 < m \leq 20$	17
$20 < m \leq 40$	9
$40 < m \leq 60$	x
$60 < m \leq 80$	19

10 Find the smallest positive integer k such that 12,348 × k is a cube number.