| Day 228 | S Tier 10-a-day |
|---|---|
| **1** A flight leaves London at 20:40 (London time). It takes 13 hours 40 minutes. When it is 12:00 in London it is 07:00 in New York. At what time, in New York time, does the flight land? Say if it is on a different day. | |
| **2** The 2nd term of an arithmetic sequence is 14. The 9th term of the sequence is 35. (a) Find an expression for the nth term of the sequence. (b) Is 68 a term of the sequence? You must show your working. | |
| **3** Given that $x > 0$, solve $x^{\frac{5}{3}} = 1024$ | |
| **4** The point P(5, −4) is reflected in the x-axis. The image is then reflected in the line $y = x$. (a) Write down the coordinates of the final image of P. (b) Describe fully the single transformation that is equivalent to these two transformations. | |
| **5** Use the iteration formula $x_{n+1} = \sqrt[3]{4x_n + 2}$ with $x_0 = 4$ (Calculator) to work out $x_1$, $x_2$ and $x_3$. Give each answer correct to 3 decimal places. | |

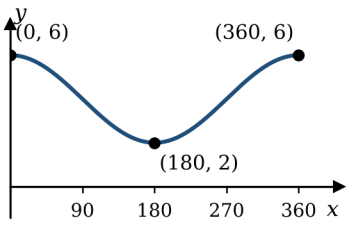
**Day 228** **S Tier 10-a-day**

**6** A population of members of a website starts at 800 and grows by 50% each year.
After how many whole years will the population first be at least double its starting value?
(Calculator)

**7** Solve $8^{2x+3} = 16^3$

**8** OA = **a** and OB = **b**.
OP = 4**b**, OQ = −3**a** + 5**b** and OR = −9**a** + 7**b**.
(a) Show that P, Q and R lie on a straight line.
(b) Work out the ratio PQ : QR in its simplest form.

**9** The diagram shows the graph of y = a cos x° + c for 0 ≤ x ≤ 360.
Some points on the graph are labelled.
Find the value of a and the value of c.




**10** The table gives information about the ages of some people.
Work out an estimate for the mean age.
Give your answer correct to 1 decimal place.
(Calculator)

| Age, a (years) | Frequency density |
|---|---|
| 0 < a ≤ 10 | 1.8 |
| 10 < a ≤ 30 | 0.8 |
| 30 < a ≤ 60 | 1.3 |
| 60 < a ≤ 100 | 1.6 |