| Day 290 | IGCSE 10-a-day |
|---|---|
| **1** A curve has equation $y = -2x - \frac{32}{\sqrt{x}}$ for $x > 0$.<br>Find the coordinates of the stationary point and determine its nature. | |
| **2** $P = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$ represents a rotation of 90° anticlockwise about the origin.<br>$Q = \begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$ represents a reflection in the line $y = -x$.<br>(a) Find the matrix that represents P followed by Q.<br>(b) Describe the single transformation that this matrix represents. | |
| **3** Solve $x^2 + 11x = -28$ | |
| **4** There are 86 families.<br>12 of them have a garden and 13 of them have a car.<br>63 of them do neither.<br>(a) Work out how many do both.<br>(b) One of the families is chosen at random.<br>Find the probability that they only have a garden. | |
| **5** Work out $3\frac{1}{2} \times 2\frac{1}{2} - 1\frac{7}{8}$<br>Give your answer as a mixed number or a fraction in its simplest form. | |

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**6** Solve $\frac{1}{x+5} + \frac{3}{x-5} = \frac{2}{3}$

**7** A particle P moves on a straight line. At time t seconds (t > 0), its distance from a point O is s metres, where

$s = t^2 + \frac{128}{t}$

Show that P is at its minimum distance from O when t = 4, and find this minimum distance.

**8** Liam, Kira and Leila share some stickers.
Liam : Kira = 2 : 9
Kira : Leila = 6 : 2
(a) Work out the ratio Liam : Kira : Leila.
(b) They share 126 stickers altogether. How many stickers does Kira get?

**9** A curve has equation $y = 3x^3 - 6x^2 + 5x$.
Find the equation of the normal to the curve at the point where x = 0.

**10** The circle has centre O and radius 13 cm. A and B are points on the circle and angle AOB = 140°. (Calculator)
Work out the area of the shaded segment. Give your answer correct to 3 significant figures.
The diagram is not drawn accurately.

