**Day 103** **B Tier 10-a-day**

**1** A is the point $(-2, 3)$ and B is the point $(4, 8)$. (Calculator)
(a) Work out the coordinates of the midpoint of AB.
(b) Work out the length of AB. Give your answer correct to 1 decimal place.

**2** Find the (a) highest common factor (HCF), (b) lowest common multiple (LCM) of 36 and 84.

**3** Simplify fully
(a) $9m \times 7n$
(b) $10p^2 \div 2p$

**4** A stratified sample of 40 students is taken from the 400 students in the table.
Work out how many students should be sampled from Year 7.

| Group | Students |
|---|---|
| Year 7 | 80 |
| Year 8 | 80 |
| Year 9 | 240 |

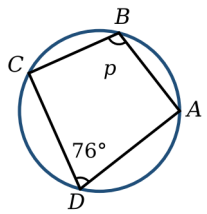
**5** $\mathbf{a} = \begin{pmatrix} -5 \\ -1 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -1 \\ -6 \end{pmatrix}$
Work out
(a) $2\mathbf{a} - \mathbf{b}$
(b) $3\mathbf{a} + 2\mathbf{b}$

**Day 103** **B Tier 10-a-day**

**6** A triangle has sides of length x cm, (x + 3) cm and (2x − 1) cm.
The perimeter of the triangle is 22 cm.
(a) Work out the value of x.
(b) Work out the length of the longest side.

**7** Estimate the value of
$\frac{5.7}{4.77} + 0.493$
Show your rounding to 1 significant figure.

**8** A, B, C and D are points on a circle.
Angle ADC = 76°.
Work out the size of angle ABC, marked p.
Give a reason for your answer.
The diagram is not drawn accurately.




**9** A coin is thrown 500 times.
It lands on heads 230 times.
(a) Work out the relative frequency of heads.
(b) Is the coin fair? Give a reason.

**10** Here is an iteration formula.
$x_{n+1} = 1 + \frac{15}{x_n}$
$x_0 = 5$
(a) Work out $x_1$
(b) Work out $x_2$. Give your answer correct to 3 decimal places. (Calculator)