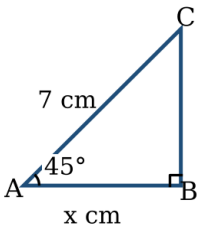
Day 13	S Tier 10-a-day

1 FitLife has a joining fee of £7.50 plus £1 per month.
GymNow has a joining fee of £5 plus £1.50 per month.
(a) Work out the number of months for which the two costs are the same.
(b) Which is cheaper for 10 months, and by how much?

2 ABC is a right-angled triangle.
Work out the exact value of x. Give your answer in its simplest form.
The diagram is not drawn accurately.



3 Solve $4x^2 + 7x - 4 = 0$
Give your answers in surd form.

4 $\mathbf{a} = \begin{pmatrix} 6 \\ 0 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} 3 \\ 1 \end{pmatrix}$ and $\mathbf{c} = \begin{pmatrix} 3 \\ 3 \end{pmatrix}$
$\mathbf{a} + k\mathbf{b}$ is parallel to $\mathbf{c}$.
Work out the value of k.

5 A and B are points on the curve $y = x^3 - 5x$.
The x coordinate of A is -2 and the x coordinate of B is 1.
Work out the gradient of the line AB.

Day 13	S Tier 10-a-day
6 A cyclist travels the first half of a journey at 30 km/h. It travels the second half of the same journey at 45 km/h. Work out the average speed for the whole journey.	
7 A retailer buys a guitar for £160. It adds an 80% mark-up to get the selling price. In a sale the selling price is reduced by 10%. Work out the percentage profit or loss on the original cost.	
8 Write $\frac{4^{n+3} \times 16^{n+2}}{4^n}$ in the form 2^{an+c} where a and c are integers.	
9 A shop mixes two types of mixed nuts. Type A costs £13.00 per kg and type B costs £7.00 per kg. They are mixed in the ratio A : B = 1 : 3. The mixture is sold for £9.35 per kg. Work out the percentage profit.	
10 A point A is on level ground in line with the base of a lighthouse. (Calculator) The angle of elevation of the top of the lighthouse from A is 32°. B is a point on the same line, 20 m further from the lighthouse than A. The angle of elevation of the top of the lighthouse from B is 17°. Work out the height of the lighthouse. Give your answer to 1 decimal place.	