Day 173 **S Tier 10-a-day**

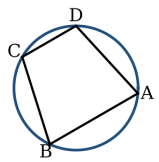
1 Factorise fully $x^4 - 16$

2 In one country, income tax is worked out like this:
The first £15,000 of income is not taxed.
The next £25,000 is taxed at 20%.
All income above that is taxed at 40%.
Mo earns £48,500 in a year.
Work out how much income tax Mo pays.

3 The table shows the number of members in each of four groups.
(a) A stratified sample of 29 is taken. Work out how many come from Group B.
(b) A different stratified sample has 9 from Group D. Work out the size of this sample.

	Group A	Group B	Group C	Group D
Number	240	140	140	60

4 A, B, C and D are points on a circle. Angle DAB = (2x + 30)°, angle BCD = (3x + 50)° and angle ABC = (3x + 30)°.
(a) Work out the value of x.
(b) Work out the size of angle ADC.
The diagram is not drawn accurately.

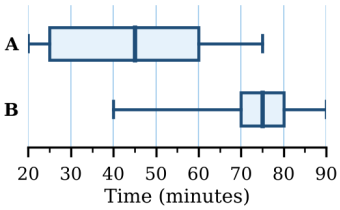


5 Use the iteration formula $x_{n+1} = \sqrt{7x_n + 12}$ with $x_0 = 3$ (Calculator)
to work out x_1, x_2 and x_3.
Give each answer correct to 3 decimal places.

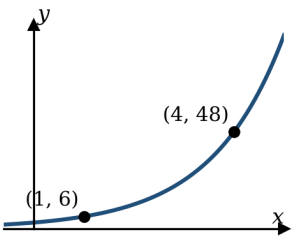
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6 Show that $2^{m+2} - 2^m$ is a multiple of 3 for all integer values of m.

7 The box plots show the times taken by two groups, A and B.
(a) Work out the interquartile range for each.
(b) Compare the distributions of A and B.



8 The diagram shows the graph of $y = ka^x$, where k and a are constants and $a > 0$.
The curve passes through the points (1, 6) and (4, 48).
Find the value of k and the value of a.



9 A shop mixes two types of flour.
Type A costs £12.00 per kg and type B costs £5.00 per kg.
They are mixed in the ratio A : B = 3 : 2.
The mixture is sold for £13.80 per kg.
Work out the percentage profit.

10 ABCD is a rectangle with AB = 7 cm and AD = 7 cm.
A point P inside the rectangle is such that $AP \leq 4$ cm and P is nearer to AB than to AD.
Work out the area of the region in which P can lie. Give your answer in terms of π.