Day 283 **S Tier 10-a-day**

1 The table shows the number of students in each of four groups.
(a) A stratified sample of 38 is taken. Work out how many come from Year 9.
(b) A different stratified sample has 30 from Year 7. Work out the size of this sample.

	Year 7	Year 8	Year 9	Year 10
Number	200	240	140	180

2 Write $\frac{x-4}{3x+4} + \frac{5}{x+2}$ as a single fraction.
Simplify the numerator.

3 Rationalise the denominator of $\frac{14}{4\sqrt{7}}$
Give your answer in its simplest form.

4 A biased wheel stops on one of four outcomes with these probabilities.
A: x; B: x + 0.1; C: 2x; D: 0.1
(a) Work out the value of x.
(b) The biased wheel is used 80 times. Work out an estimate for the number of times it stops on A.

5 (a) Write 42 and 3024 as products of prime factors.
(b) Find the HCF and the LCM of 42 and 3024.
Give your answers as numbers.

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6 V is directly proportional to the square root of r.
When r = 36, V = 42.
(a) Find a formula for V in terms of r.
(b) Find the value of V when r = 1.

7 In one country, income tax is worked out like this:
The first £15,000 of income is not taxed.
The next £20,000 is taxed at 20%.
All income above that is taxed at 45%.
Kofi earns £40,000 in a year.
Work out how much income tax Kofi pays.

8 OA = $\mathbf{a}$ and OB = $\mathbf{b}$.
OP = $3\mathbf{b}$, OQ = $\mathbf{a} + \mathbf{b}$ and OR = $3\mathbf{a} - 3\mathbf{b}$.
(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 table gives information about the times of some people.
Work out an estimate for the mean time.
Give your answer correct to 1 decimal place.
(Calculator)

Time, t (minutes)	Frequency density
$0 < t \leq 10$	1.3
$10 < t \leq 20$	1.1
$20 < t \leq 40$	1.9
$40 < t \leq 60$	0.6

10 The diagram shows triangle ABC. (Calculator)
(a) Work out the length of AB, marked x, to 1 decimal place.
(b) Work out the area of triangle ABC to 3 significant figures.
The diagram is not drawn accurately.

