Day 274 **S Tier 10-a-day**

1 The table shows the number of students in each of four groups.
(a) A stratified sample of 29 is taken. Work out how many come from Year 9.
(b) A different stratified sample has 18 from Year 7. Work out the size of this sample.

	Year 7	Year 8	Year 9	Year 10
Number	90	80	90	30

2 FitLife has a joining fee of £8 plus £4.50 per month.
GymNow has a joining fee of £3.50 plus £5 per month.
(a) Work out the number of months for which the two costs are the same.
(b) Which is cheaper for 12 months, and by how much?

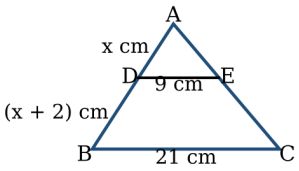
3 A metal pipe is a hollow cylinder of length 50 cm. (Calculator)
The outer radius is 6 cm and the inner radius is 4 cm.
The density of the metal is 11.3 g/cm^3.
Work out the mass of the pipe. Give your answer in kilograms correct to 3 significant figures.

4 (a) Write $x^2 - 10x + 21$ in the form $(x + p)^2 + q$
(b) Write down the coordinates of the turning point of the curve $y = x^2 - 10x + 21$

5 Rationalise the denominator of $\frac{2}{3\sqrt{7}}$
Give your answer in its simplest form.

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6 In the diagram, DE is parallel to BC.
AD = x cm, DB = (x + 2) cm, DE = 9 cm and BC = 21 cm.
(a) Find the value of x.
(b) Work out the length of AB.
The diagram is not drawn accurately.



7 Without using a calculator, work out $0.\dot{9}\dot{4} + 0.\dot{7}\dot{5}$
Give your answer as a fraction in its simplest form.

8 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
$0 < t \leq 10$	0.7
$10 < t \leq 20$	0.5
$20 < t \leq 40$	1.7
$40 < t \leq 60$	1.4

9 Work out $(4.9 \times 10^7) + (5.1 \times 10^4)$
Give your answer in standard form.

10 The line $y = 2x + k$ is a tangent to the circle $x^2 + y^2 = 19$.
Find the possible values of k.
Give any surds in their simplest form.