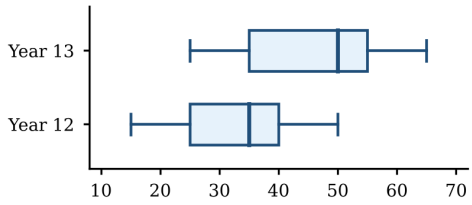
Day 178	A Level Maths: B Tier 10-a-day
1 The line segment AB is a diameter of a circle, where A is $(-6, 4)$ and B is $(-8, 2)$. Find an equation of the circle in the form $(x - a)^2 + (y - b)^2 = k$.	
2 A sector of a circle has radius 12 cm and arc length 15.6 cm. Find (a) the angle of the sector in radians, (b) the area of the sector.	
3 A car travelling at 8 m s^{-1} brakes and comes to rest with constant deceleration 4 m s^{-2}. Find (a) the distance travelled while braking, (b) the time taken to stop.	
4 A battery lasts X hours, normal with mean 170, s.d. 6. Find, to 3 s.f., the probability a value is (a) less than 176, (b) between 176 and 182.	
5 The circle C has equation $(x + 2)^2 + (y + 1)^2 = 13$. The point P(0, 2) lies on C. Find an equation of the tangent to C at P, in the form $ax + by + c = 0$ with integer a, b, c.	

Day 178 **A Level Maths: B Tier 10-a-day**

6 A missile is projected horizontally at 392 m s^{-1} from a point high above the ground.
Take g = 9.8 m s^{-2}.
Find the speed and the direction of motion 42 s later, to 1 d.p. below the horizontal.

7 f(x) = ln x + x − 6. Use the Newton-Raphson method with
$x_0 = 5$ to find x_1 and x_2, to 4 d.p.

8 The box plots show the times taken (minutes) to complete a puzzle for two groups.
(a) Find the interquartile range of each group.
(b) Compare the two distributions.



9 A sequence is defined by $u_{n+1} = \frac{1}{1 - u_n}$, $u_1 = \frac{1}{2}$.

(a) Show that the sequence is periodic, stating the period.

(b) Find u_{40} and $\sum_{r=1}^{40} u_r$.

10 Find the exact value of

$\int_0^{\frac{\pi}{4}} (\sin^2 2x + \cos 4x)\, dx$.