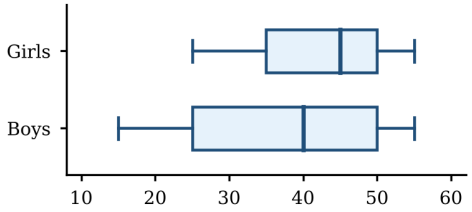
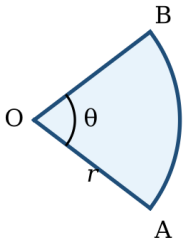
Day 125 **A Level Maths: B Tier 10-a-day**

1 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.



2 The diagram shows a sector OAB of a circle with centre O, radius 6 cm and angle 1.4 radians.
Find (a) the arc length AB, (b) the area of the sector.



3 A block of mass 5 kg is pulled along rough horizontal ground by a horizontal force of 19.8 N. It accelerates at 2 m s^{-2}.
Take g = 9.8 m s^{-2}.
Find the coefficient of friction between the block and the ground.

4 Differentiate $y = 2\,\text{cosec}\,3x$ with respect to x, and find the exact gradient when $x = \frac{\pi}{12}$.

5 A particle of mass 5 kg is acted on by forces $(-\mathbf{i} + \mathbf{j})$ N and $\mathbf{P}$ N only. Its acceleration is $(-3\mathbf{i} + \mathbf{j})$ m s^{-2}.
Find $\mathbf{P}$, and its magnitude to 3 significant figures.

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6 The curve C has equation $y = x^2 + 2x - 4$. C is reflected in the y-axis and then translated by $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$. Find its new equation.	
7 A journey takes X minutes, normal with s.d. 8. Given $P(X < 88.2) = 0.95$, find the mean (3 s.f.).	
8 Use the substitution $u = \ln x$ to find the exact value of $\int_1^e \frac{\ln x}{x}\,dx$.	
9 The line l has equation $y = -x$. The point P is $(-2, 4)$. (a) Find the line through P perpendicular to l, as $ax + by + c = 0$ with integer a, b, c. (b) Find the foot F and the exact distance PF.	
10 The line $3x - 4y = k$ is a tangent to the circle $(x - 1)^2 + (y - 1)^2 = 25$. Find the two possible values of k.	