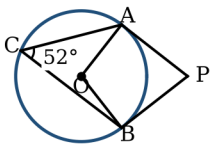
Day 214	S Tier 10-a-day
1 (a) Write $4x^2 - 16x + 7$ in the form $a(x + p)^2 + q$ (b) Write down the coordinates of the turning point of the curve $y = 4x^2 - 16x + 7$	
2 A sector of a circle has radius 24 cm and angle 150°. The sector is made into a cone by joining the two straight edges together. (a) Work out the radius of the base of the cone. (b) Work out the exact volume of the cone. Give your answer in terms of π, as a surd if necessary.	
3 A train travels the first half of a journey at 30 km/h. It travels the second half of the same journey at 60 km/h. Work out the average speed for the whole journey.	
4 Use the iteration formula $x_{n+1} = 2 + \frac{2}{x_n}$ with $x_0 = 4$ (Calculator) to work out x_1, x_2 and x_3. Give each answer correct to 3 decimal places.	
5 PA and PB are tangents to a circle, centre O. C is a point on the circle. Angle ACB = 52°. (a) Work out the size of angle AOB. (b) Work out the size of angle APB. The diagram is not drawn accurately. 	

Day 214	S Tier 10-a-day
6 In a coach, the ratio of the number of adults to the number of children is 7 : 3. Then 12 adults are removed and 2 more children are added. The ratio is now 8 : 7. How many children were there at the start?	
7 Given that $x > 0$, solve $x^{-\frac{3}{2}} = \frac{1}{1331}$	
8 A bag contains some counters. 4 of them are green and the rest are white. Two counters are taken at random without replacement. The probability that both are green is $\frac{2}{7}$. Work out how many counters are white.	
9 OA = $\mathbf{a}$ and OB = $\mathbf{b}$. OP = 4$\mathbf{b}$, OQ = 4$\mathbf{a}$ + 10$\mathbf{b}$ and OR = 6$\mathbf{a}$ + 13$\mathbf{b}$. (a) Show that P, Q and R lie on a straight line. (b) Work out the ratio PQ : QR in its simplest form.	
10 Show that $\sqrt{4 + 2\sqrt{3}} = 1 + \sqrt{3}$	