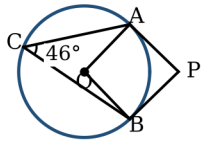
Day 189	S Tier 10-a-day

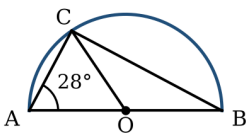
1 Work out the value of $3p - q^3$
when $p = 3$, $q = 4$ and $r = -1$.

2 PA and PB are tangents to a circle, centre O. C is a point on the circle. Angle ACB = 46°.
(a) Work out the size of angle AOB.
(b) Work out the size of angle APB.
The diagram is not drawn accurately.



3 Here are five numbers: 2, x, 3x, 3x + 3, x − 2.
The mean of the five numbers is 15.
(a) Work out the value of x.
(b) Work out the range of the five numbers.

4 AB is a diameter of a circle, centre O. C is a point on the circle. Angle BAC = 28°.
(a) Work out the size of angle ACB.
(b) Work out the size of angle COB.
The diagram is not drawn accurately.



5 Write $10^4 \times 12^4$ as a product of powers of prime numbers.

Day 189	S Tier 10-a-day
6 Solve the simultaneous equations $y = x^2 + 3x - 2$ $y = 2x$	
7 An alloy is made by mixing 60 cm^3 of lead with 20 cm^3 of iron. The density of lead is 11.3 g/cm^3. The density of iron is 7.9 g/cm^3. Work out the density of the alloy.	
8 (a) Show that the equation $x^2 - 6x - 5 = 0$ can be rearranged to give $x = 6 + \frac{5}{x}$ (Calculator) (b) Use the iteration formula $x_{n+1} = 6 + \frac{5}{x_n}$ with $x_0 = 6$ to work out x_1 and x_2. Give each answer correct to 3 decimal places.	
9 Write $\frac{9^n \times 3^{n-2}}{9^n}$ in the form 3^{an+c} where a and c are integers.	
10 A point A is on level ground in line with the base of a mast. (Calculator) The angle of elevation of the top of the mast from A is 59°. B is a point on the same line, 50 m further from the mast than A. The angle of elevation of the top of the mast from B is 49°. Work out the height of the mast. Give your answer to 1 decimal place.	