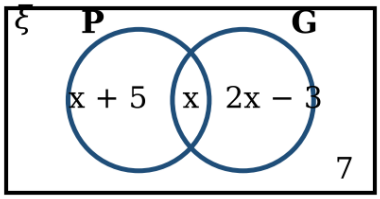
Day 185	S Tier 10-a-day

1 Factorise fully $3x^2 - 3x - 90$

2 Leila changes £900 into dollars at £1 = $1.18.
Leila spends $120 and then changes the rest back into pounds at £1 = $1.25.
How many pounds does Leila get back?

3 Two solid shapes, A and B, are mathematically similar.
The surface area of A is 18 cm^2 and the surface area of B is 162 cm^2.
The volume of A is 100 cm^3.
Work out the volume of B.

4 The Venn diagram shows how many of 29 students play the piano (P) or the guitar (G).
(a) Work out the value of x.
(b) A student is chosen at random from those who play the guitar. Work out the probability that this student also plays the piano.



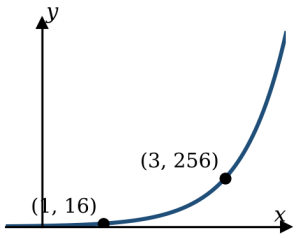
5 Write $\frac{13}{2-\sqrt{6}}$ in the form $\frac{p+q\sqrt{6}}{r}$
where p, q and r are integers and r > 1,
and the fraction is in its simplest form.

Day 185 **S Tier 10-a-day**

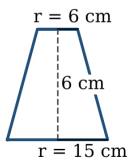
6 F is inversely proportional to the square root of d.
When d = 4, F = 3.
(a) Find a formula for F in terms of d.
(b) Find the value of d when F = 1.

7 In a fruit box, the ratio of the number of apples to the number of pears is 7 : 3.
Then 12 apples are removed and 10 pears are removed.
The ratio is now 3 : 1.
How many pears were there at the start?

8 The diagram shows the graph of $y = ka^x$, where k and a are constants and a > 0.
The curve passes through the points (1, 16) and (3, 256).
Find the value of k and the value of a.



9 A cone is cut parallel to its base to make a smaller cone and a frustum.
The frustum has height 6 cm, top radius 6 cm and base radius 15 cm.
Work out the volume of the frustum. Give your answer in terms of π.



10 Simplify $\frac{1}{3+\sqrt{3}} + \frac{2}{3-\sqrt{3}}$
Give your answer with a rational denominator.