Day 152	S Tier 10-a-day
1 The ratio of men to women people at a meeting is 7 : 6. Then $\frac{2}{3}$ of the men and $\frac{1}{2}$ of the women are taken out. Work out the ratio of men to women now.	
2 Given that $\sqrt{125} - \sqrt{20} = \sqrt{n}$, find the value of n.	
3 A sector of a circle has radius 15 cm and angle 90°. (a) Work out the length of the arc of the sector. (b) Work out the area of the sector. Give each answer in terms of π.	
4 60 fish in a lake are caught, tagged and put back. Later, a second sample of 100 fish is caught. 12 of these are tagged. (a) Work out an estimate for the number of fish in a lake. (b) State one assumption you have made.	
5 The point P(−4, 6) lies on the graph of y = f(x). Write down the coordinates of the image of P on the graph of (a) y = f(x) + 3 (b) y = f(−x)	

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6 A radioactive sample has a mass of 960 g. Its mass halves every 3 hours.
(a) Work out the mass after 12 hours.
(b) After how many hours will the mass first be less than 25 g?

7 Write $\frac{6}{5-\sqrt{7}}$ in the form $\frac{p+q\sqrt{7}}{r}$
where p, q and r are integers and $r > 1$,
and the fraction is in its simplest form.

8 A rectangle has area $(21 + 14\sqrt{2})$ cm^2 and length $(3 + \sqrt{2})$ cm.
Find the width of the rectangle.
Give your answer in the form $a + b\sqrt{2}$

9 Solve $x - 6\sqrt{x} + 8 = 0$

10 The diagram shows an equilateral triangle inside a circle of radius 10 cm.
The three vertices of the triangle lie on the circle.
Work out the area of the shaded region. Give your answer in the form $a\pi - b\sqrt{3}$.

