Day 186 **S Tier 10-a-day**

1 Here are six numbers.

$\sqrt{50}$, $\pi \div 2$, $\sqrt{3} \times \sqrt{5}$, $\frac{\sqrt{18}}{\sqrt{2}}$, $(1 + \sqrt{2})^2$, $\sqrt[3]{27}$

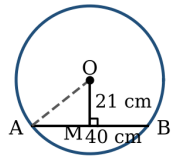
Write down the rational numbers.

2 AB is a chord of a circle, centre O. M is the midpoint of AB. (Calculator)

(a) Work out the radius of the circle.

(b) Work out angle AOB, to 1 decimal place.

The diagram is not drawn accurately.



3 Write $\frac{15}{2 - \sqrt{5}}$ in the form $p + q\sqrt{5}$

where p and q are integers.

4 $f(x) = 2x + 5$ and $g(x) = \frac{8}{x}$

(a) Find gf(x).

(b) Solve gf(x) = 8

5 Hassan, Kira and Jamal share some money.

Hassan : Kira = 4 : 7

Kira : Jamal = 8 : 3

(a) Work out the ratio Hassan : Kira : Jamal.

(b) They share £545 altogether. How much money does Jamal get?

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6 The point P(4, 1) is rotated 90° anticlockwise about the origin. The image is then reflected in the line $y = -x$. (a) Write down the coordinates of the final image of P. (b) Describe fully the single transformation that is equivalent to these two transformations.	
7 The probability that a light bulb in a hallway fails in any month is $\frac{3}{10}$. Events on different occasions are independent. Work out the probability that this happens at least once in 5 months. Give your answer correct to 3 significant figures. (Calculator)	
8 Show that $3^{m+2} + 3^m$ is always a multiple of 10.	
9 $f(x) = \frac{-x-6}{3x+1}$ where $x \neq -\frac{1}{3}$ (a) Show that $ff(x) = x$. (b) Write down $f^{-1}(x)$.	
10 Two solid shapes, A and B, are mathematically similar. The surface area of A is 12 cm^2 and the surface area of B is 48 cm^2. The volume of A is 125 cm^3. Work out the volume of B.	