

2015-2016 Primary Solutions Round 1

- P1.1.** A snowman, which some children made on a wintry Saturday morning, remained intact for the first three days. On the fourth day the weather became milder and it lost one tenth of its bulk. The following day it lost one ninth of what remained, the next day one eighth of what remained, and so on. However, one day the sun shone so brightly the snowman lost one fifth of its *original* bulk and disappeared, leaving no trace.

On which day of the week did it finally disappear? **Explain your reasoning.**

Solution:

By the end of the fourth day: $9/10$;

By the end of day 5: $8/10$;

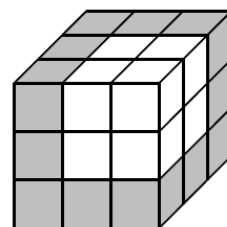
By the end of day 6: $7/10$,

By the end of day 11: $2/10 = 1/5$.

By the end of day 12: the snowman lost $1/5$ of its original bulk and disappeared.

Answer: Wednesday.

- P1.2.** The solid large cube in the diagram is made up from individual smaller cubes. The individual small cubes were all originally white until some faces were painted grey as shown. What is the largest possible number of completely white cubes?



Solution

There are $3 \times 3 \times 3 = 27$ small cubes in all.

12 cubes with at least one grey face are visible.

So the remaining 15 small cubes could be all white.

So the largest possible number of all white cubes is 15.

- P1.3.** Tessa was practising subtraction. After doing a calculation correctly, she copied it into her notebook but was distracted and instead of writing down each figure, she wrote either the figure one higher or the figure one lower in the sequence 0, 1, ..., 9. What she wrote down was

$$\begin{array}{r} 2910 \\ -1497 \\ \hline 2106 \end{array}$$

Find the correct figures, explaining how you worked it out.

Solution

In the last column, the 0 should be a 1; the 7 could be a 6 or an 8 and the 6 a 5 or a 7. We need two figures which add to 11 so the 7 should be a 6 and the 6 a five..... etc to give

$$\begin{array}{r} 3801 \\ 2586 \\ \hline 1215 \end{array}$$