Coded pictures

Draw coded pictures on graph paper starting with a dot on the grid intersection and following the instructions below.

For example: $\downarrow 1 \searrow 2$ means that one has to draw a line going down one box of the grid, and then continue drawing diagonally down-right across two boxes.

**Problem 1** (Start at the point marked “1” on the handout grid)

$$
\begin{align*}
\uparrow 1 & \rightarrow 1 \downarrow 2 \rightarrow 3 \swarrow 2 \leftarrow 1 \\
\downarrow 1 & \searrow 1 \leftarrow 3 \nearrow 1 \uparrow 1 \leftarrow 1 \\
\nwarrow 2 & \rightarrow 3 \uparrow 1 \leftarrow 1
\end{align*}
$$

**Problem 2** (Start at the point marked “2” on the handout grid)

$$
egin{align*}
\rightarrow 1 & \downarrow 1 \leftarrow 3 \swarrow 2 \rightarrow 1 \downarrow 1 \\
\nwarrow 1 & \rightarrow 3 \nwarrow 1 \uparrow 1 \rightarrow 1 \searrow 2 \\
\leftarrow 3 & \uparrow 2 \leftarrow 1 \nearrow 1
\end{align*}
$$
Problem 3

A wicked witch grabbed Hermione Granger and took her to the witch’s cabin. Hermione remembered the path to the cabin but she had no graph paper to draw it:

\[ \downarrow 2 \uparrow 1 \rightarrow 2 \downarrow 2 \leftarrow 4 \uparrow 1 \rightarrow 1 \]

Give Hermione the code for the return trip to the school without drawing the path.
Problem 4

Examine the beginning of the code for a picture. Find the pattern and add another line of code.

→1  ↓2  ←3  ↑4
→5  ↓6  ←7  ↑8
→9  ↓10  ←11  ↑12

Draw the picture in your notebooks starting at the center of the page.

Can you imagine what the picture will look like if you continue the pattern?

Problem 5

Sasha’s friends wrote all the numbers of the day and all the numbers of the month of their birthdays on a piece of paper. The sum of all the numbers is 35. Their birthdays all fall on different days of the year. What is the greatest possible number of friends Sasha may have?