Stellenbosch Camp Test 1
Intermediate Question 5 Marking Scheme

1 Question

Find all functions $f : \mathbb{R} \to \mathbb{R}$ such that

$$f(f(x+y)) = x + f(y)$$

for all $x, y \in \mathbb{R}$

2 Partials awarded if the problem was not solved completely

- 1 mark: Showing $f(f(x)) = f(x)$
- 1 mark: Showing $f(x) = x + c$
- 2 marks: Showing f is either surjective **or** injective. 3 marks if both.
- 1 mark: Guessing that $f(x) = x$ is a solution **and** checking that it is valid.

3 Marks deducted if the problem is essentially solved.

- -1 mark: Claiming a non-trivial fact without proof.
- -1 mark: Failing to check that $f(x) = x$ is a valid solution