**1. What is the relationship between def statements and lambda expressions?**

Answer 1: Both def statements and lambda expressions define functions in Python. The difference lies in their syntax and use cases. def is used for creating named functions, while lambda is for anonymous functions.

**2. What is the benefit of lambda?**

Answer 2: Lambdas offer conciseness and are often used for short-lived, simple operations. They are useful when a small function is needed for a short period and defining a full function with def seems excessive.

**3. Compare and contrast map, filter, and reduce**.

Answer 3: Map applies a function to all items in an iterable, filter selects items based on a condition, and reduce performs a cumulative operation on the elements. Map and filter return iterable objects, while reduce returns a single value.

**4. What are function annotations, and how are they used?**

Answer 4: Function annotations are metadata attached to function parameters and return values. They provide information about the types or purposes of these elements. Annotations are optional and don't affect the function's behavior but can be used by tools like type checkers.

**5. What are recursive functions, and how are they used?**

Answer 5: Recursive functions are functions that call themselves during their execution. They are used for solving problems that can be broken down into smaller, similar sub-problems. Proper base cases are crucial to prevent infinite recursion.

**6. What are some general design guidelines for coding functions?**

Answer 6: Design guidelines for coding functions include keeping them small and focused, using meaningful names, providing clear documentation, avoiding global variables, and ensuring a single responsibility for each function.

**7. Name three or more ways that functions can communicate results to a caller.**

Answer 7: Functions can communicate results to a caller through return statements, global variables (not recommended), and by modifying mutable objects passed as arguments (side effects). Additionally, they can use print statements for debugging purposes.