Student ID (**print** clearly; 1 digit per underline): ____ ____ ____ ____ ____ ____

1 Type Inference A

```
fun mystery_a(param) =
    case param of
            [] => 0
      | head :: tail => head + mystery_a(tail)
```

1. What is the type of `param`? ....

2. What is the return type of `mystery_a`? ....

3. What does `mystery_a` do?

   ....

2 Type Inference B

(∗Note: ^ is the string concatenation operator in SML.∗)
```
fun mystery_b(a, b, c, d) =
    a ^ b(c) ^ d
```

1. What is the type of `a`? ....

2. What is the type of `b`? ....

3. What is the type of `c`? ....

4. What is the type of `d`? ....

5. What is the return type of `mystery_b`? ....

6. What does `mystery_b` do?

   ....

3   Type Inference C

Given the length function from the List signature

```
val length :  'a list -> int
```

returns the number of elements in the argument

And the max function from the Integer signature

```
val max :  int * int -> int
```

returns the larger of the arguments.

fun mystery_c(param) =
    case param **of**
           [] $\Rightarrow$ NONE
    | head :: tail $\Rightarrow$ **case** (mystery_c(tail)) **of**
                NONE $\Rightarrow$ SOME(List.length(head))
            | SOME(value) $\Rightarrow$ SOME(Int.max(List.length(head), value))

1. What is the type of `param`? ....

2. What is the return type of `mystery_c`? ....

3. What does `mystery_c` do?

....