Quiz 2

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1. Consider the following method.

   ```
   def make_adder(x):
     def adder(n):
        return x + n
     return adder

   make_adder(4)(5)
   ```

   (a) What is the operator of the above expression?

   (b) What are the operands?

   (c) Draw the expression tree.

2. Fill in the blanks (*without using any numbers in the first blank*) such that the entire expression evaluates to **9**.

   ```
   (lambda x: lambda y: _____)(__)(lambda z: z*z)()
   ```

3. What is wrong with the following function? How can we fix it?

   ```
   def factorial(n):
       return n * factorial(n)
   ```

4. **Environment Diagrams**

(a)
```
def dream1(f):
    kick = lambda x: mind()
    def dream2(secret):
        mind = f(secret)
        kick(2)
    return dream2

inception = lambda secret: lambda: secret
real = dream1(inception)(42)
```

(b)
```
def bar(f):
    def g(x):
        if x == 1:
            return f(x)
        else:
            return f(x) + g(x - 1)
    return g

f = 4
bar(lambda x: x + f)(2)
```