MC28 Homework 3

Due October 2, 1995

1. Draw a enviroment diagram illustrating the following example:

```
(define x 3)

(define add-x
  (lambda (y)
    (+ x y)))

(define do-twice-to
  (lambda (f x)
    (f (f x))))

(do-twice-to add-x 4)
;Value: 10
```

   Label on your diagram with the number 1 the environment in which `(+ x y)` is evaluated the first time and label with the number 2 the environment in which it is evaluated the second time.

2. Draw a enviroment diagram illustrating the following example:

```
(define compose
  (lambda (f g)
    (lambda (x)
      (f (g x)))))

(define make-expter
  (lambda (e)
    (lambda (x)
      (expt x e))))

(define value-at-two
  (lambda (f)
    (f 2)))

(define power-of-two (compose value-at-two make-expter))

(power-of-two 3)
;Value: 8
```

   Mark on you digram with the corresponding letter the environment in which each of the following expressions was evaluated:

(a) `(lambda (x) (f (g x)))`

(b) `(f (g x))`

(c) `(lambda (x) (expt x e))`

(d) `(f 2)`

(e) `(expt x e)`