Zeye Gu 101036562

Question 2 "Beta Reduction"

a)

$\lambda a.(\lambda b.(\lambda c.(b((ab)c)))) \ (\lambda d.(\lambda e.(d(d(de)))))$

$\lambda b.(\lambda c.(b(((\lambda d.(\lambda e.(d(d(de)))))b)c)))$

$\lambda b.(\lambda c.(b((\lambda e.(b(b(be))))c)))$

$\lambda b.(\lambda c.(b(b(b(bc)))))$

This is the representation of four

b)

$\lambda a. \ (\lambda b. \ (\lambda f. \ (\lambda x. \ ((a \ f)((b \ f)x))))) \ (\lambda f. \ (\lambda x. \ (f \ x)))) \ (\lambda f. \ (\lambda x. \ x))$

$\lambda b. \ (\lambda f. \ (\lambda x. \ (((\lambda f. \ (\lambda x. \ x))f)((b \ f)x)))) \ (\lambda f. \ (\lambda x. \ (f \ x)))$

$\lambda f. \ (\lambda x. \ (((\lambda f. \ (\lambda x. \ x))f)(((\lambda f. \ (\lambda x. \ (f \ x)))f)x)))$

$\lambda f. \ (\lambda x. \ (\ (\lambda x. \ x)(((\lambda f. \ (\lambda x. \ (f \ x)))f)x)))$

$\lambda f. \ (\lambda x. \ (\ (\lambda x. \ x)((\lambda x. \ (f \ x))x)))$

$\lambda f. \ (\lambda x. \ (\ (\lambda x. \ x)(f \ x)))$

$\lambda f. \ (\lambda x. \ (\ (\lambda x. \ x)(f \ x)))$

$\lambda f. \ (\lambda x. \ (f \ x))$

This is the representation of one.