Lambda Calculus Week3

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1 Ker2009 Comp Practice 1d(i to iv)

i $(xyz)[y/z]$
There is no bound variable.
But a replacement would look like:
(xzz)

ii $(\lambda x.x)[y/z]$
There is no bound variable y

iii $(\lambda y.xy)[zz/x]$
x is not bound but a replacement would look like
$(\lambda y.zzy)$

iv $(\lambda y.xy)[yy/x]$
Replacing yy for x would then bind the free variable. I should not replace it with that variable.

2 Ker2009 Exercises 1.4(i to iii), *1.8, (* is extra credit)

1.4

i $(\lambda x.yx)[yz/x]$
$(\lambda x.yx)[yz/x][y/s]$
$(\lambda x.sx)[yz/x]$
$(\lambda yz.syz)$ ... is this right? :(

ii $(\lambda y.xy)[yx/x]$
$(\lambda y.yxy)$ or...
$(\lambda y.xy)[yx/x][t/y]$
$(\lambda t.xt)[yx/x]$
$(\lambda t.yxt)$

iii $(\lambda z.(\lambda x.yx)xz)[zx/x]$
$(\lambda z.(\lambda x.yx)xz)[zx/x][r/z][t/x]$
$(\lambda r.(\lambda t.yt)xr)[zx/x]$
$(\lambda r.(\lambda t.yt)zxr)$

3 Ker2009 Comp Practice 2a,2b

2a Which of the following are true?

i true?

ii ??

iii ugh?

iv true?

2b Determine *all* redexes in each of:

i $(\lambda x.x)(kk)$
kk

ii $(\lambda xy.(\lambda z.z)x)\Omega$
$\lambda y.(\lambda z.z)\Omega$
$\lambda z.z$

iii $\lambda x.(\lambda y.(\lambda z.(\lambda p.p)z)y)x$
It looks like i cant do anything? ... or...
$\lambda x.(\lambda y.(\lambda z.z)y)x$
$\lambda x.(\lambda y.y)$ this is dumb

iv yii :(