Lambda Calculus

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1 Ker Comp Practice 1c

1c For each occurrence of a variable in each of these terms, say whether it is free or bound:

i $\lambda xyz.xyz$
x = bound
y = bound
z = bound

ii $\lambda xyz.yz(\lambda p.xyz)$
$(\lambda xyz.(yz)(\lambda p.(xy)z))$
y = bound
z = bound
x = free
y = free
z = free

iii $\lambda xy.yz(\lambda z.zz)$
y = bound
z = free
z = bound
z = bound

2 Ker Exercises 1.3

1.3 List all the free variables in

i $\lambda xy.(\lambda u.uvxy)z$
u = bound
v = free
x = free
y = free
z = free

ii $\lambda xy.z(\lambda u.uvxy)$
z = free
u = bound
v = free
x = free
y = free

iii $\lambda wx.z(\lambda u.uvwx)$
z = free
u = bound
v = free

w = free
x = free

iv $\lambda vw.z(\lambda u.uvvw)$
z = free
u = bound
v = free
v = free
w = free

v $\lambda yx.z(\lambda u.uvyx)$
z = free
u = bound
v = free
y = free
x = free