1.

(λx.xyx)(λz.z)

->(λz.z)y(λz.z)

-> y(λz.z)

2.

Times 1 2 ->*2

times = λm.λn.λs.λz.m(ns)z

= (λm.λn.λs.λz.m(ns)z)12

=(λn.λs. λz.1(ns)z)2

=λs.λz.1(2s)z

=λs.λz.(λs'.λz'.sz')(2s)z

=λs.λz.(λz'.(2s)z')z

=λs.Λz.(2s)z

=λs.λz.((λs'.λz'.s'(s'z'))s)z

=λs.λz.((λz'.s(sz'))z

=λs.λz.s(sz)

= 2

3.

Y = λf.(λx.f(x x))(λx.f (xx))

Yg

= (λf.(λx.f (xx))(λx.f(x x)))g

= (λx.g(xx))(λx.g(xx))

=g((λx.g(xx))(λx.g(xx)))

=g(Yg)

4.

S =λf.λg.λx.fx(g x) K =λx.λy. x

SKK

= (λf.λg.λx.fx(gx))KK

= (λg.λx.kx(gx))K

=λx.kx(kx)

=λx.(λx.λy.x)x(kx)

=λx.(λy.x)(kx)

=λx.x

5.

or false true ->*true

or = λx.λy.x true y

= (λx.λy.x true y) false true

=(λy. false true y) true

= fasle true true

=(λt.λf.f) true true

=(λf.f) true

=true