Lambda Calculus

For the following forms apply β-reduction and α-substitution to reduce to lowest form. Indicate at each step the rule you are applying.

1. (λx.x)( λx.x )
2. (λx.x x) (λx. λy.x x)
3. ((λx.(x y))(λz.z))
4. (λz.z) (λy.y y) (λx.x a)
5. (λz.z) (λz.z z) (λz.z y)
6. (λx.λy.x y y) (λa.a) b
7. (λx.x x) (λy.y x) z
8. (λx. (λy. (x y)) y) z
9. ((λx.x x) (λy.y)) (λy.y)
10. (((λx. λy.(x y))(λy.y)) w)