Wing Design

Design Parameters

M	0.04	
S	4	ft²
A	7.0	
Λ_{LE}	0	deg
t/c	0.12	
λ	1.00	
W c-start	5	lbf/f^2
W c-end	5	lbf/f^2
q c-start	2.29	lbf/f^2
q c-end	2.29	lbf/f^2
Cl c-start	0.53	
Cl c-end	0.53	

Airfoil Data

Name	*Clark Y*	
Cl_{max}	1.5	
Cl_{α}	0.1	1/deg
a.c.	0.253	c
α_{0L}	-4	deg
Cd0	0.01	
r_{le}	0.0024	c
Cl_{minD}	0.1-0.4	
(t/c)max	0.12	c

Air Properties

Cruise Alt.	300	ft
V	44.12	f/s
ρ	0.0758741	lbm/f^3
q	2.2933098	lbf/f^2
μ	0.0000107	lbm/(f-s)
ν (cruise)	0.000141	f^2/s

Calculations

b	5.5	ft
M_{eff}	0.04	
c_r	0.8	ft
c_t	0.8	ft
m.a.c.	**0.8**	ft
β	1.00	
$C_{L\alpha}$	**0.083**	1/deg
C_{Lo}	0.33	
α_{trim}	**2.4**	deg
C_{Ltrim}	0.527	
k	0.0568411	
C_D	**0.022**	
L/D	**23.46**	

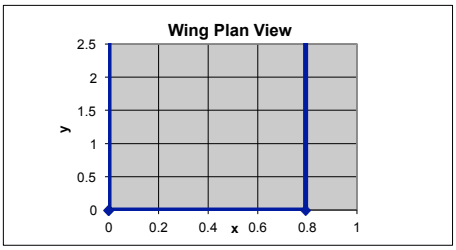
Total Drag	**0.2267287**	lbf

Sweep Angles

	x/c	$\Lambda_{x/c}$ (deg)
LE	0.00	0.0
1/4C	0.25	0.0
a.c	0.25	0.0
(t/c)max	0.12	0.0
TE	1.00	0.0

Viscous Drag

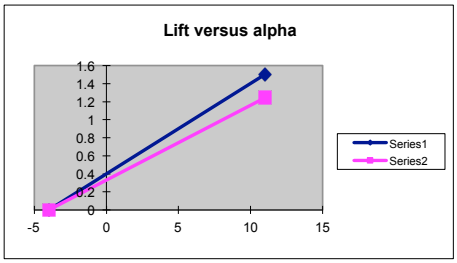
V_eff	44.1192	f/s
q_eff	2.2933098	lbf/f^2
Re_mac	2.48E+05	
sqrt(Re)	498.032	
Cf	2.67E-03	
S_wet	8.97336	ft²
F	1.2282617	
Q	1	
C_{D0}	**0.0066793**	



Plotting:

Spanwise View

x	y
0	0
0.8	0
0.792825	2.7748874
0	2.7748874
0	0



Lift Curves

α	Cl	α	CL
-4	0	-4	0
11	1.5	11	1.2414967