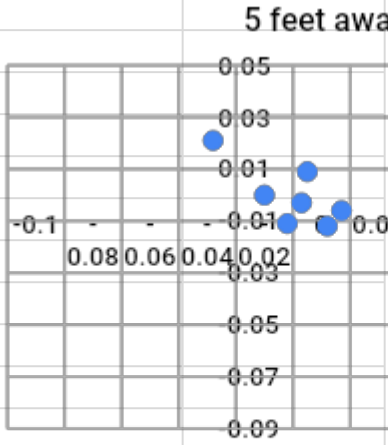
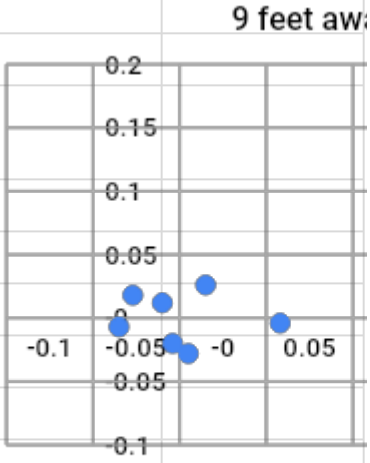
Gun Distance (feet)	5 feet		9 feet		13 f
	x axis	y axis	x axis	y axis	x axis
Ball 1 (m)	-1.000	5.500	0.000	1.500	5.400
Ball 2 (m)	0.800	3.400	3.100	0.200	7.400
Ball 3 (m)	1.600	2.300	4.000	-0.600	8.100
Ball 4 (m)	2.100	3.100	0.800	4.000	10.400
Ball 5 (m)	2.300	4.300	2.500	3.400	12.500
Ball 6 (m)	3.000	2.200	5.000	4.800	16.500
Ball 7 (m)	3.500	2.800	9.300	1.800	11.000

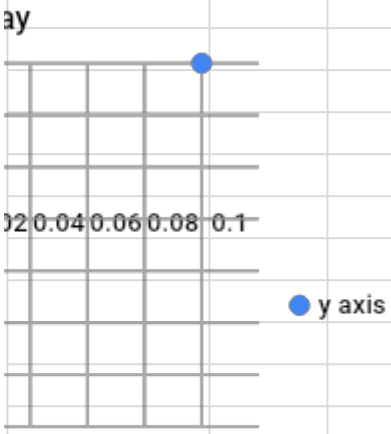
Gun Distance (feet)	5 feet		9 feet		13 f
	x axis	y axis	x axis	y axis	x axis
Ball 1 (m)	-0.028	0.021	-0.035	-0.007	-0.048
Ball 2 (m)	-0.010	0.000	-0.004	-0.020	-0.028
Ball 3 (m)	-0.002	-0.011	0.005	-0.028	-0.021
Ball 4 (m)	0.003	-0.003	-0.027	0.018	0.002
Ball 5 (m)	0.005	0.009	-0.010	0.012	0.023
Ball 6 (m)	0.012	-0.012	0.015	0.026	0.063
Ball 7 (m)	0.017	-0.006	0.058	-0.004	0.008
xbar & ybar	0.000	0.000	0.000	0.000	0.000
ACCURACY					
PRECISION					
Standard Dev (S_x&S_y)	0.015	0.012	0.031	0.020	0.037
Sigma_p	0.013		0.025		0.0
Sigma_b	0.001		0.001		0.0
CEP	0.016		0.030		0.0
S_xlow	0.010		0.020		0.0
S_xhigh	0.033		0.068		0.0
S_ylow	0.008		0.013		0.0
S_yhigh	0.026		0.044		0.0
err_low	0.005		0.010		0.0
err_high	0.018		0.034		0.0
S_xbar	0.006		0.012		0.0
95% conf interval	-0.012	0.000	-0.023	0.000	-0.028
		0.023		0.024	
CEP_low	0.011		0.020		0.0
CEP_high	0.033		0.064		0.0
diameter of barrel	0.038 m				

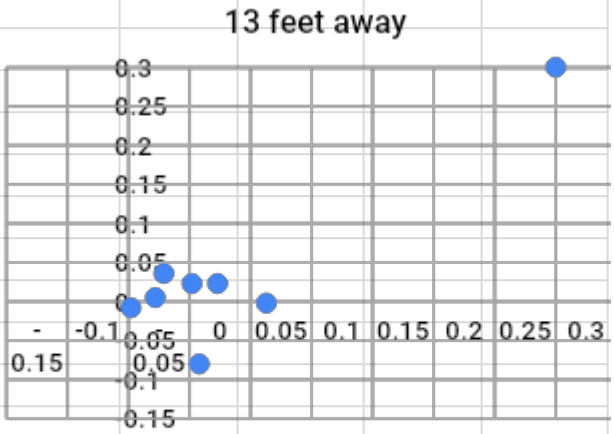
eet	16 feet	
y axis	x axis	y axis
-0.600	6.100	0.900
0.700	8.400	0.900
3.800	15.000	0.400
2.500	15.500	0.700
2.500	18.100	3.900
0.000	20.000	-1.200
-7.800	18.300	-2.200

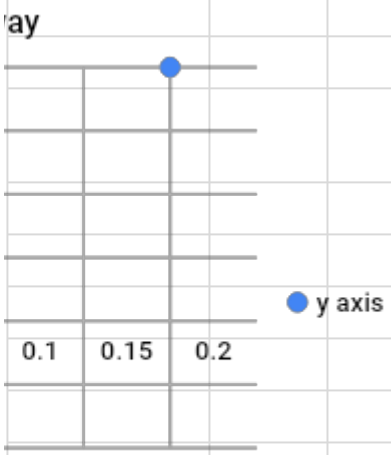


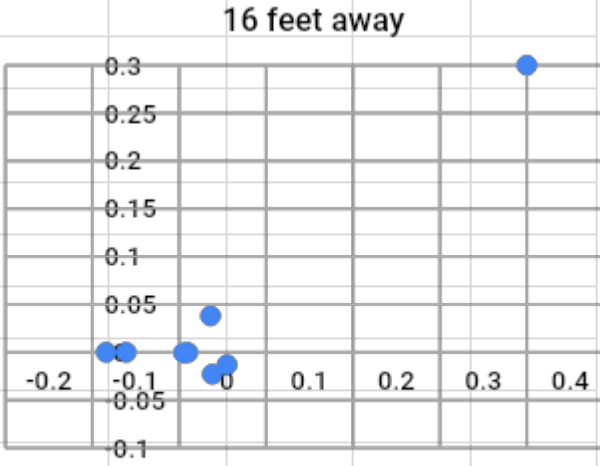
eet	16 feet	
y axis	x axis	y axis
-0.008	-0.084	0.000
0.005	-0.061	0.000
0.036	0.005	-0.001
0.023	0.010	0.000
0.023	0.036	0.038
-0.002	0.055	-0.013
-0.080	0.038	-0.023
0.000	0.000	0.000
0.038	0.053	0.019
38	0.036	
00	0.000	
44	0.042	
24	0.034	
81	0.116	
025	0.012	
85	0.042	
14	0.015	
49	0.052	
14	0.020	
0.000	-0.040	0.000
0.028		0.040
30	0.027	
93	0.094	




ay
02 0.04 0.06 0.08 0.1
y axis


13 feet away
0.3
0.25
0.2
0.15
0.1
0.05
-0.1
0
0.05
0.1
0.15
0.2
0.25
0.3
0.15
-0.05
-0.1
-0.15


ay
0.1
0.15
0.2
y axis


16 feet away
0.3
0.25
0.2
0.15
0.1
0.05
-0.2
-0.1
0
0.1
0.2
0.3
0.4
-0.05
-0.1

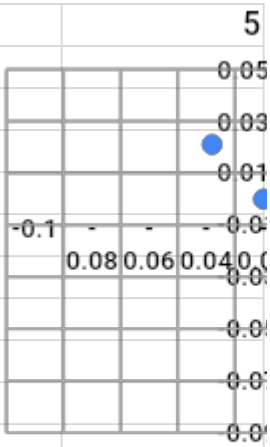
y axis
y axis

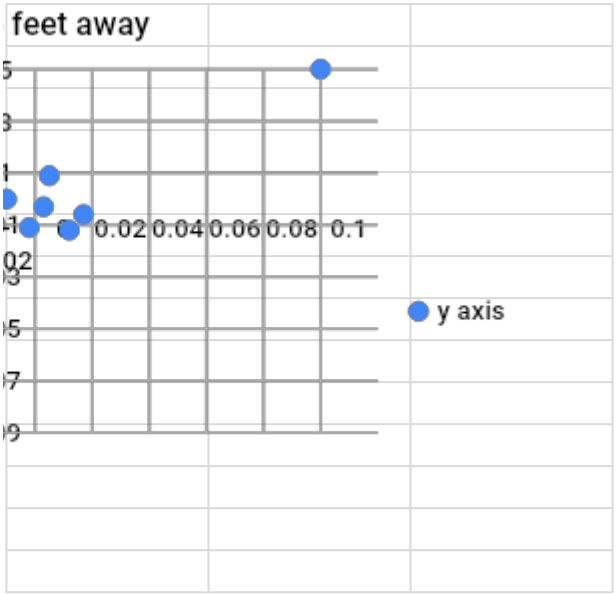
distance of barrel to center of camera	0.064 m				
distance of center of barrel to center of camera	0.083 m			k	1.177
S_xlow					
n=7	chi2inv((1+0.95)/2,n-1)	gave us	14.449		
S_xHigh					
n = 7	chi2inv((1-0.95)/2,n-1)	gave us	1.237		
13ft				16ft	
Ball	x-axis	y-axis		Ball	x-axis
1.000	5.400	-0.600		1.000	6.100
2.000	7.400	0.700		2.000	8.400
3.000	8.100	3.800		3.000	15.000
4.000	10.400	2.500		4.000	15.500
5.000	12.500	2.500		5.000	18.100
6.000	16.500	0.000		6.000	20.000
7.000	11.000	-7.800		7.000	18.300
5ft					
Ball	x-axis	y-axis		x = .071	
1.000	-1.000	5.500		y = 0.005	
2.000	0.800	3.400			
3.000	1.600	2.300			
4.000	2.100	3.100			
5.000	2.300	4.300			
6.000	3.000	2.200			
7.000	3.500	2.800			

p = 50%					
		9ft			
y-axis		Ball	x-axis	y-axis	
0.900		1.000	0.000	1.500	
0.900		2.000	3.100	0.200	
0.400		3.000	4.000	-0.600	
0.700		4.000	0.800	4.000	
3.900		5.000	2.500	3.400	
-1.200		6.000	5.000	4.800	
-2.200		7.000	9.300	1.800	
sigma_P13 = .5*(Sx13+Sy13)					
sigma_P13 =					
0.038					
>> .05/0.0376					
ans =					
1.330					
>> 1 - exp((-.5)*(1.3298)^2)					
ans =					

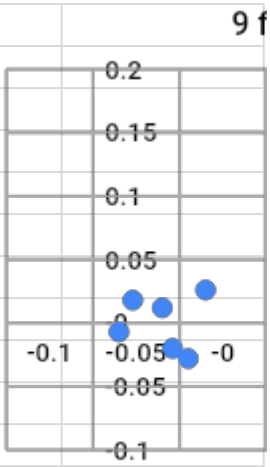
0.587					
>> 1.177*0. 0376					
ans =					
0.044					

Gun Distance (feet)	5.000	
	x axis	y axis
Ball 1 (m)	0.052	-0.008
Ball 2 (m)	0.053	0.010
Ball 3 (m)	0.069	0.005
Ball 4 (m)	0.070	0.014
Ball 5 (m)	0.080	0.008
Ball 6 (m)	0.105	-0.005
Ball 7 (m)	0.070	0.012
	0.071	0.005

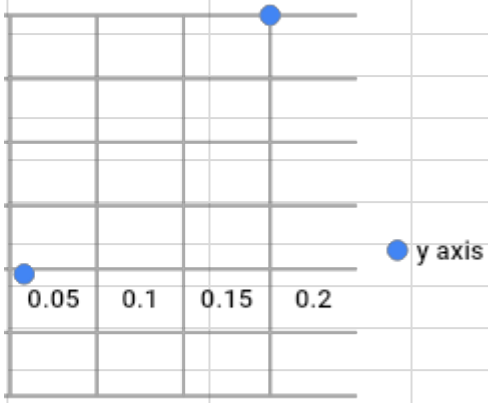



feet away
0.02
0.04
0.06
0.08
0.1
y axis

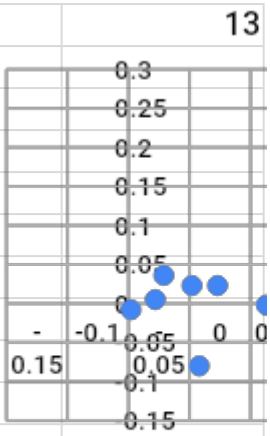
Gun Distance (feet)	9.000	
	x axis	y axis
Ball 1 (m)	0.100	-0.044
Ball 2 (m)	0.098	-0.058
Ball 3 (m)	0.094	-0.074
Ball 4 (m)	0.092	-0.099
Ball 5 (m)	0.080	-0.110
Ball 6 (m)	0.140	-0.042
Ball 7 (m)	0.146	-0.075
	0.107	-0.072

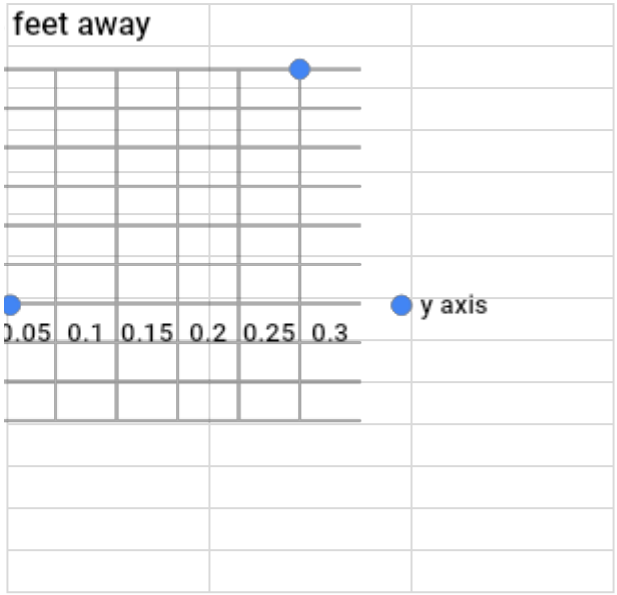


feet away

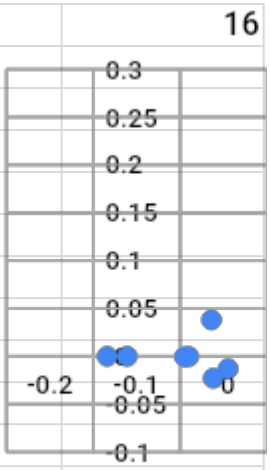


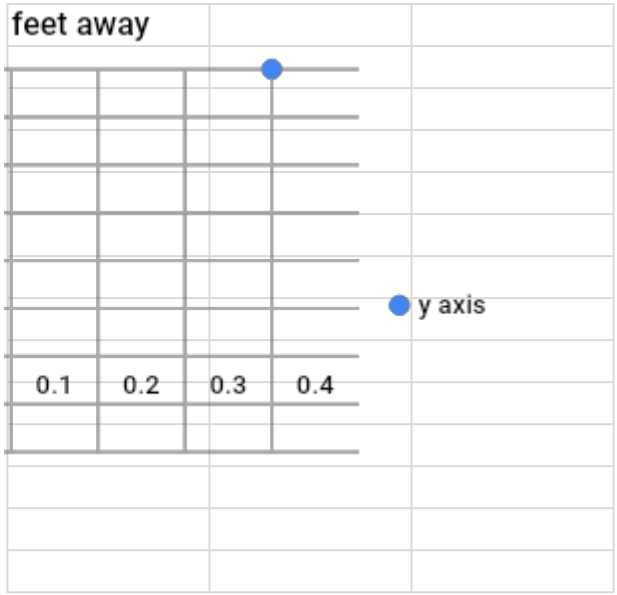
Gun Distance (feet)	13.000	
	x axis	y axis
Ball 1 (m)	0.176	-0.074
Ball 2 (m)	0.200	-0.059
Ball 3 (m)	0.216	-0.075
Ball 4 (m)	0.216	-0.088
Ball 5 (m)	0.234	-0.148
Ball 6 (m)	0.235	-0.150
Ball 7 (m)	0.240	-0.150




feet away
.05
0.1
0.15
0.2
0.25
0.3
y axis

Gun Distance (feet)	16.000	
	x axis	y axis
Ball 1 (m)	0.294	-0.087
Ball 2 (m)	0.235	-0.140
Ball 3 (m)	0.275	-0.153
Ball 4 (m)	0.313	-0.195
Ball 5 (m)	0.350	-0.192
Ball 6 (m)	0.350	-0.145
Ball 7 (m)	0.355	-0.124




feet away
0.1
0.2
0.3
0.4
y axis