Name_____

Student Data Table

Test	String Clip Position	Mass Clip Position	Boom Angle	String Angle	String Length	Spring Scale Force
1	40 cm	40 cm	0°	30°		
2	40 cm	40 cm	0°	45°		
3	40 cm	40 cm	0°	60°		
4	40 cm	40 cm	30°	45°		
5	40 cm	40 cm	45°	45°		
6	40 cm	40 cm	60°	45°		
7	40 cm	25 cm	0°	30°		
8	40 cm	25 cm	0°	45°		
9	40 cm	25 cm	0°	60°		
10	40 cm	25 cm	30°	45°		
11	40 cm	25 cm	45°	45°		
12	40 cm	25 cm	60°	45°		
13	40 cm	10 cm	0°	30°		
14	40 cm	10 cm	0°	45°		
15	40 cm	10 cm	0°	60°		
16	40 cm	10 cm	30°	45°		
17	40 cm	10 cm	45°	45°		
18	40 cm	10 cm	60°	45°		
19	25 cm	40 cm	0°	30°		
20	25 cm	40 cm	0°	45°		
21	25 cm	40 cm	0°	60°		
22	25 cm	40 cm	30°	45°		
23	25 cm	40 cm	45°	45°		
24	25 cm	40 cm	60°	45°		
25	25 cm	25 cm	0°	30°		
26	25 cm	25 cm	0°	45°		
27	25 cm	25 cm	0°	60°		
28	25 cm	25 cm	30°	45°		
29	25 cm	25 cm	45°	45°		
30	25 cm	25 cm	60°	45°		

Test	String Clip Position	Mass Clip Position	Boom Angle	String Angle	String Length	Spring Scale Force
31	25 cm	10 cm	0°	30°		
32	25 cm	10 cm	0°	45°		
33	25 cm	10 cm	0°	60°		
34	25 cm	10 cm	30°	45°		
35	25 cm	10 cm	45°	45°		
36	25 cm	10 cm	60°	45°		
37	10 cm	40 cm	0°	30°		
38	10 cm	40 cm	0°	45°		
39	10 cm	40 cm	0°	60°		
40	10 cm	40 cm	30°	45°		
41	10 cm	40 cm	45°	45°		
42	10 cm	40 cm	60°	45°		
43	10 cm	25 cm	0°	30°		
44	10 cm	25 cm	0°	45°		
45	10 cm	25 cm	0°	60°		
46	10 cm	25 cm	30°	45°		
47	10 cm	25 cm	45°	45°		
48	10 cm	25 cm	60°	45°		
49	10 cm	10 cm	0°	30°		
50	10 cm	10 cm	0°	45°		
51	10 cm	10 cm	0°	60°		
52	10 cm	10 cm	30°	45°		
53	10 cm	10 cm	45°	45°		
54	10 cm	10 cm	60°	45°		

Post-Lab Questions *(Answer on a separate sheet of paper.)*

1. Which boom setup completed the objectives in the best possible manner (i.e., the sign is hanging as far away from the wall as possible using the least amount of string)? How much did it cost for the cable?

2. In order to provide the strongest support, where is the best place to hang the mass in relation to the string attachment?

3. How does the angle of the boom affect the tension in the string?

4. Compare the force measurements for when the string and mass are attached at the same position.

5. Which boom would produce the most tension in the string? Why? Assume the mass in each figure is the same.
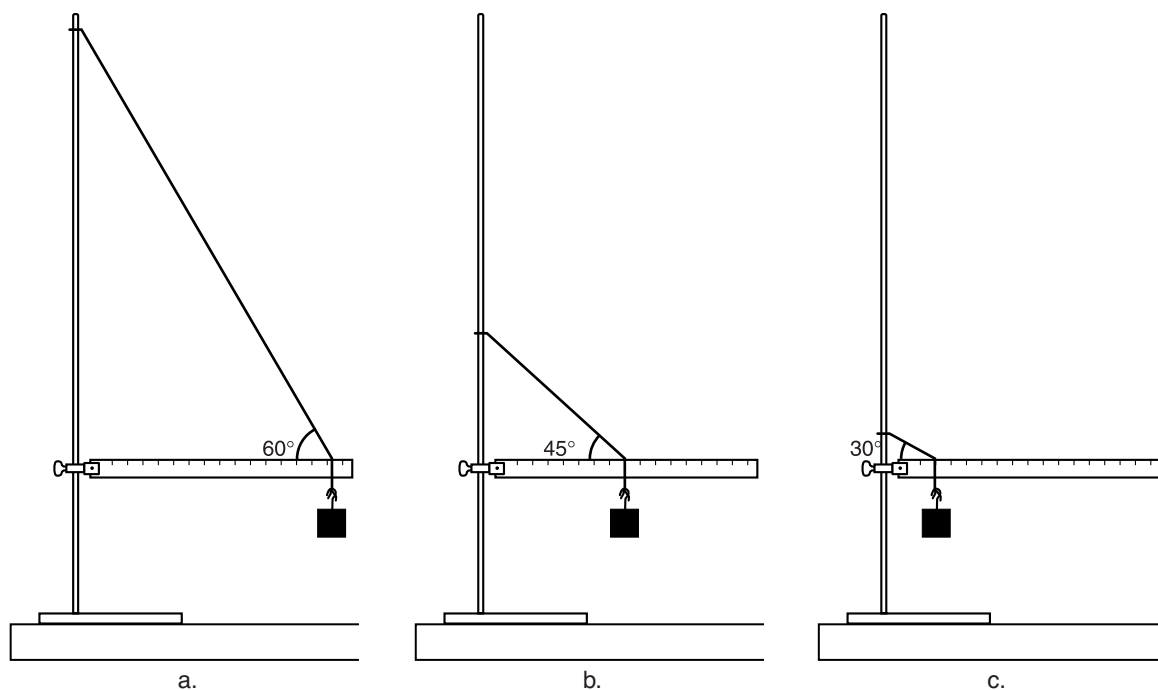

a.   b.   c.

Figure 10.

6. *(Optional)* For some experiments, the tension in the string is greater than the actual weight of the object. Why is the tension in the string larger than the weight of the object?

7. *(Optional)* For other experiments, the tension in the string is less than the actual weight of the object. Why does it take less cable strength to support the object? Where is the additional lifting force coming from?

8. *(Optional)* For the "optimal" boom setup in Question 1, calculate the horizontal and vertical forces exerted on the truss by the ring stand at the pivot point. *Note:* Units need to be in meters and kilograms.