Consulting Homework 10

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1. Sample size calculations.

a.

i. Assuming a known SD

Table 1: Total absorbed zinc (TAZ) by dose

ID	2mg	5mg	10mg	15mg	20mg	30mg
1	1.81	3.55	8.28	10.33	6.70	13.28
2	1.77	5.00	8.33	11.28	9.77	12.14
3	2.09	NA	7.57	10.57	13.38	13.42
4	1.09	NA	7.99	12.40	10.95	9.83
5	1.66	3.81	7.94	10.46	16.32	11.54
6	1.91	4.33	5.40	7.18	4.74	9.66
7	1.31	1.28	6.71	6.25	17.13	7.52
8	1.28	3.13	7.04	7.54	8.68	12.36

Table 2: Standard deviation of TAZ by zinc dose

	x
2mg	0.3500204
5mg	1.2728812
10mg	0.9937771
15mg	2.2077878
20mg	4.4094944
30mg	2.0489610

Using the highest SD, for a conservative sample size estimate (90% power, alpha = 0.05):

$$n = \frac{\sigma^2 (Z_{0.9} + Z_{0.975})^2}{(\text{detectable difference})^2} = \frac{19.44364(1.28 + 1.96)^2}{(0.6)^2} = \frac{204.3026}{0.36} = 567.5071$$

So for 90% power to detect a TAZ of 0.6 mg/day, Jamie will need 568 participants (assuming a fairly high SD of 4.41 mg/day).

ii. Assuming an unknown SD