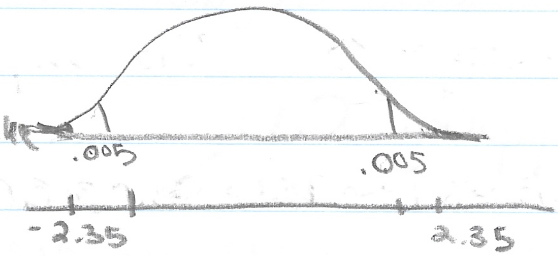
C. Howard

MSDS 6371 HW 2

1) $H_0: \mu = 1.8$ $H_a: \mu \neq 1.8$

2. Draw and shade and find critical value



3. Find the test statistic. -2.35

4. Find the p-value: P-value 0.0342 < 0.05

5. We reject the null hypothesis

6. There is sufficient evidence to suggest that these bats come from the same population having a mean weight equal to 1.8g (p-value 0.0342)

B. Below are comparisons to those found in SAS:

	SAS	R
t-statistic	-2.35	-2.34
p-value	0.0342	0.0342
CI	[1.50, 1.78]	[1.50, 1.78]

Comparisons are equal to those found in SAS.

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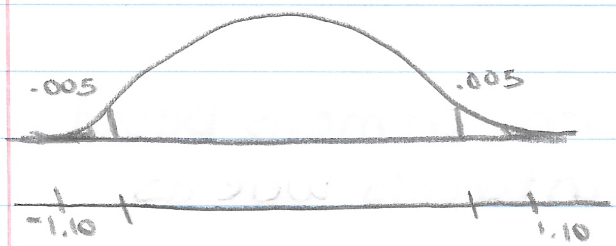
2) A, B, C

1. $H_0: \mu_F - \mu_{NF} = 0$ $H_a: \mu_F - \mu_{NF} \neq 0$

2. Draw and shade and find critical value



3. Find the test statistic $t = 1.10$

4. Find the p-value. p-value $= 0.2771 > 0.05$

5. Fail to reject H_0

6. There is not sufficient evidence to suggest that the mean age of those who were fired is different from the mean age of those who were not fired (p-value $= 0.2771$). Since this was a random sample of government employees in Samoa, we can generalize this inference to all government-employed people in Samoa.

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C) The p-value found in the age discrimination question (p=0.2771) was greater than the p-value in the bats question p=0.0342. In the previous question we rejected the null hypothesis and noted there was sufficient evidence the bats were from the same population.

D) The values for the difference in means based on a 95% confidence intervals were as follows:

Fired [42.8, 48.8]
Not Fired [41.7, 46.1]

E)

i. $$s = \sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2}}$$

$$s = \sqrt{\frac{(20)(6.52)^2 + (29)(5.88)^2}{21+30-2}}$$

$$s_p = \sqrt{\frac{850.21 + 1002.65}{49}}$$

$$s_p = \sqrt{\frac{1852.86}{49}} = 6.14$$

ii. $$SE = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

$$SE = \sqrt{\frac{(6.52)^2}{21} + \frac{(5.88)^2}{30}}$$

$$SE = \sqrt{\frac{42.51}{21} + \frac{34.57}{30}}$$

$$SE = \sqrt{2.02 + 1.15}$$

$$SE = \sqrt{3.17}$$
$$= 1.78$$

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2F) Comparison between the code run in SAS compared to R are as follows:

	SAS	R
t-statistic	1.10	1.09
p-value	0.2763	0.2771
confidence interval	[-1.619, 5.504]	[-1.593, 5.441]

Differences between data sets are minimal

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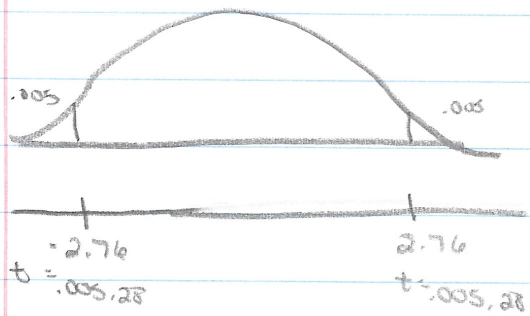
3)

1) $H_0: \mu_{smu} = \mu_{seattle}$ $H_a: \mu_{smu} \neq \mu_{seattle}$

2) Draw and shade



3) Find t-statistic $t = 1.40$

4) Find p-value $p = 0.1732 > 0.05$

5) Fail to reject H_0

6) There is not sufficient evidence to suggest the mean amount of pocket cash from SMU students is different than students from Seattle U. (p-value = 0.1732 from a t-test. These 30 students were not a random sample, therefore inference cannot be drawn beyond the 30 subjects in the sample

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D. The p-value from this test p=0.1732 was slightly higher than the pvalue ~~of~~ on the permutation test p=0.135. The ~~sarp~~ p-value for the permutation test would be smaller given the fact the permutations yielded a difference is sample means that was as extreme or more extreme than this observed difference.

Camille Howard

MSDS 6371 HW 2 4 Output

4A.

proc power;

twosamplemeans

meandiff = 1.92

stddev = 6.14

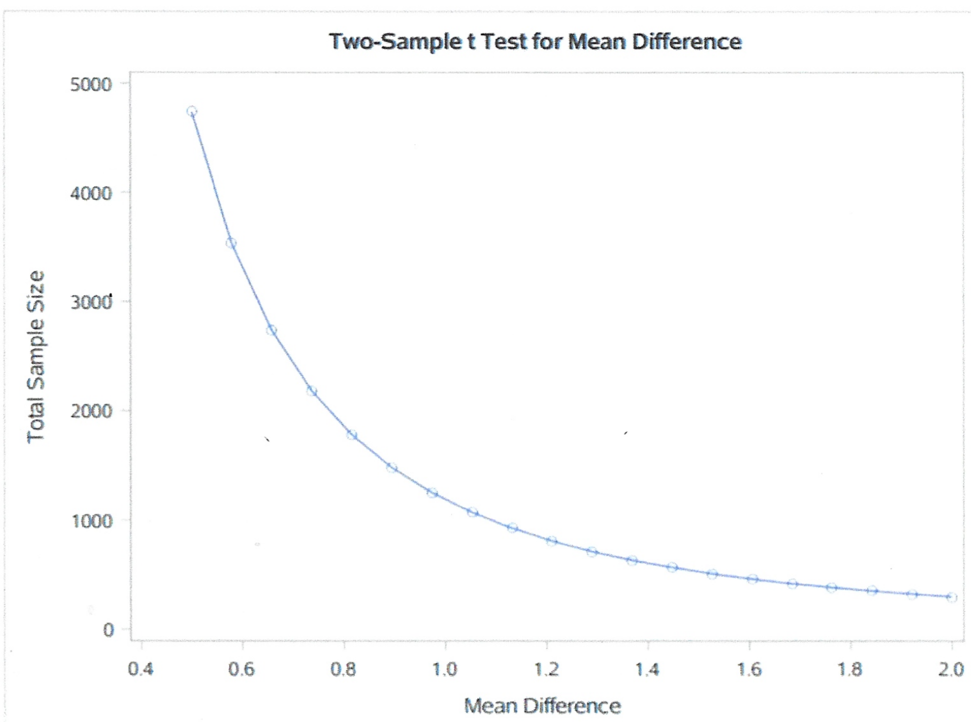
ntotal = .

power = .8;

plot x = effect min =.5 max = 2;

run;

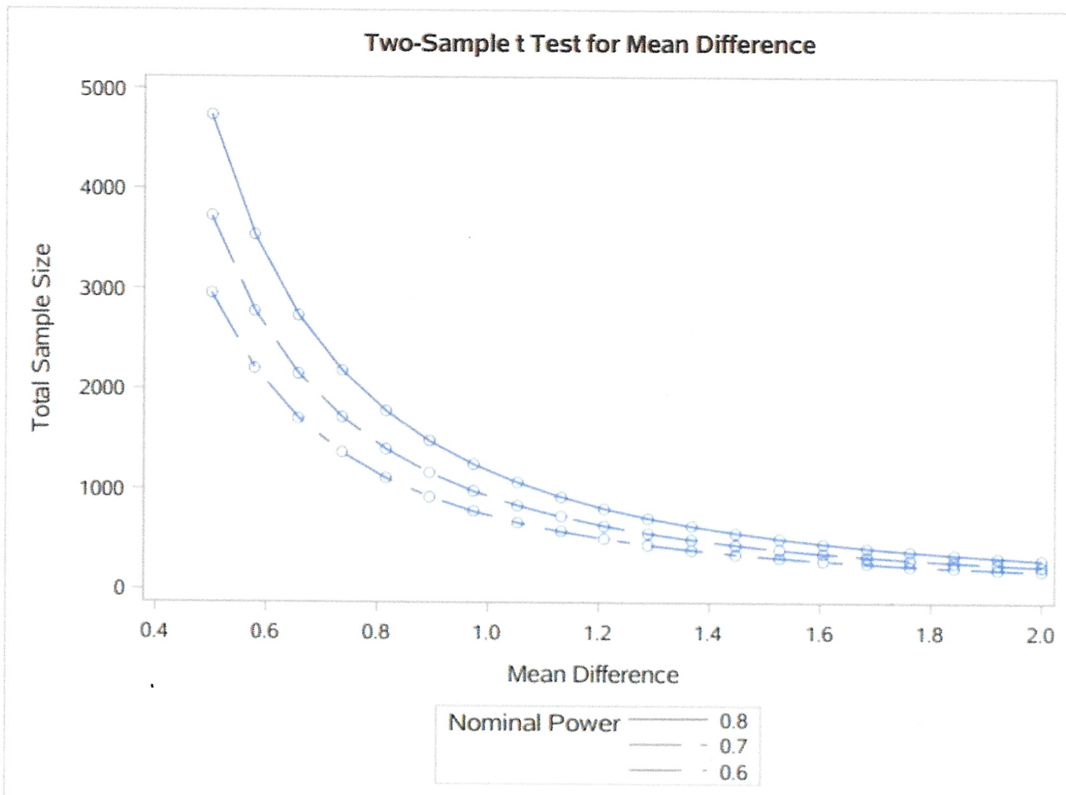
The POWER Procedure
Two-Sample t Test for Mean Difference



4B.

```
proc power;
twosamplemeans
meandiff = 1.92
stddev = 6.14
ntotal = .
power = .8 .7 .6;
plot x = effect min =.5 max = 2;
run;
```

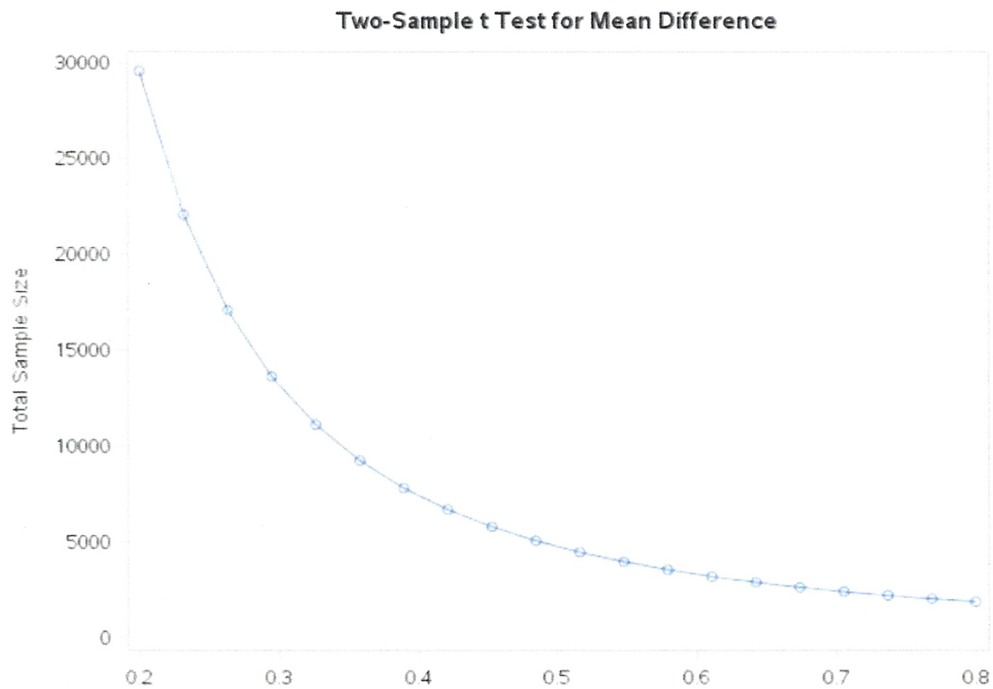
The POWER Procedure
Two-Sample t Test for Mean Difference



4C.

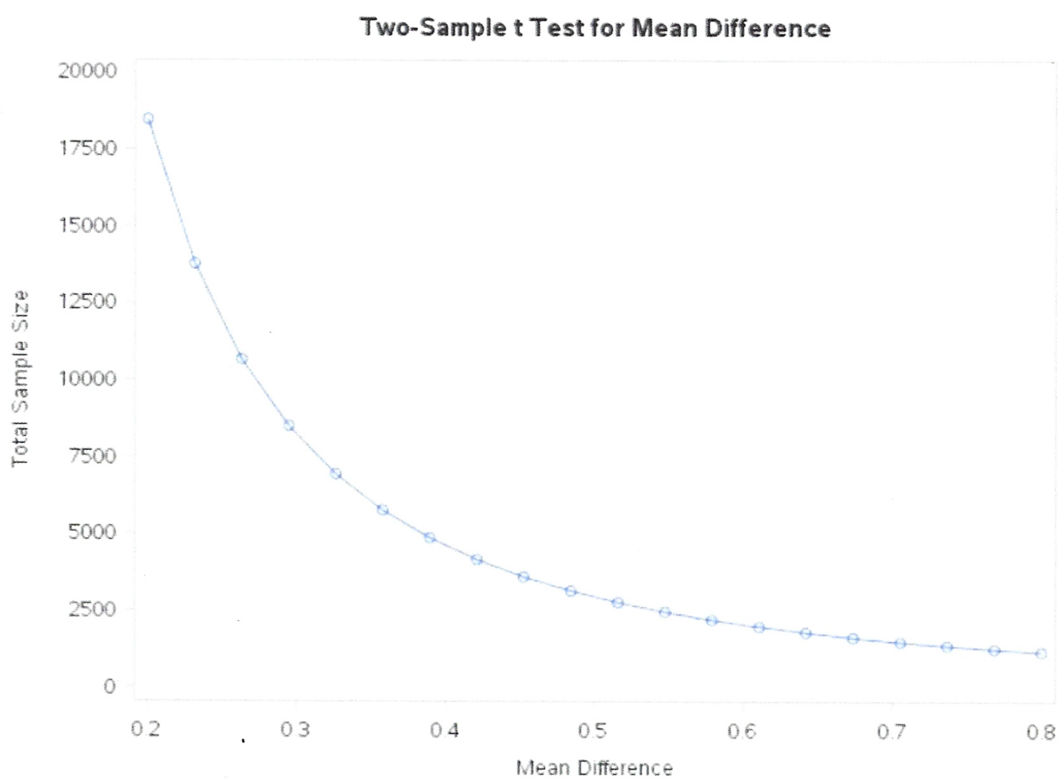
```
proc power;
twosamplemeans
meandiff = 1.92
stddev = 6.14
ntotal = .
power = .80;
plot x = effect min= .2  max = .8;
run;
```

The POWER Procedure
Two-Sample t Test for Mean Difference



```
proc power;
twosamplemeans
meandiff = 1.92
stddev = 6.14
ntotal = .
power = .60;
plot x = effect min= .2  max = .8;
run;
```

The POWER Procedure
Two-Sample t Test for Mean Difference



60% power resulted in significantly smaller sample size, compared to 80% power.