Stat 311: HW 8, Chapter 10, Problem Set A Solutions

Fritz Scholz

1 (a) Given that we are told that the sample comes from a normal population we should use the one-sample t-test and reject H_0 when the t-statistic is too large. The observed value of this t-statistic is

$$t = \frac{3.194887 - 0}{\sqrt{104.0118/400}} = 6.265333$$

(b) Since we reject for large values of t the correct p-value is given by iv) (`1-pt(1.253067,399)= 0.1054576`) but iii) (`1-pnorm(1.253067)=0.1050907`) gives a very good approximation.

(c) The answer is True, since $0.3044555 < 0.05$.

2. Based on slides 23 and 24 for Chapter 10 and

```
> qbinom(.025,20,.5)
[1] 6
> pbinom(6,20,.5)
[1] 0.05765915
> pbinom(5,20,.5)
[1] 0.02069473
```

we see that $1 - 2 \cdot 0.02069473 = 0.9586105$ comes closest to the targeted 0.95 confidence level and that we should take $c_\alpha = 5$ and therefore $[X_{(5+1)}, X_{(20-5)}]$ as our confidence interval. Coding `Big` as 255

```
> ions <- c(251,238,249,255,243,248,229,255,235,244,254,251,252,244,230,222,224,246,255,239)
> sort(ions)
 [1] 222 224 229 230 235 238 239 243 244 244 246 248 249 251 251 252 254 255 255
[20] 255
```

we get $[238, 251]$ as our 95.9% confidence interval for the median. The noteworthy feature is that the observations labeled as `Big` do figure in this process and are not thrown out.