

# STAT2012 - Practial 3

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## Question 1

```
> survey = read.csv("http://rome/u/UG/IM/STAT2012/r/survey.csv")
> attach(survey)
> pulse.sf = pulse[smoke == 1 & sex == 2]
> pulse.sf
```

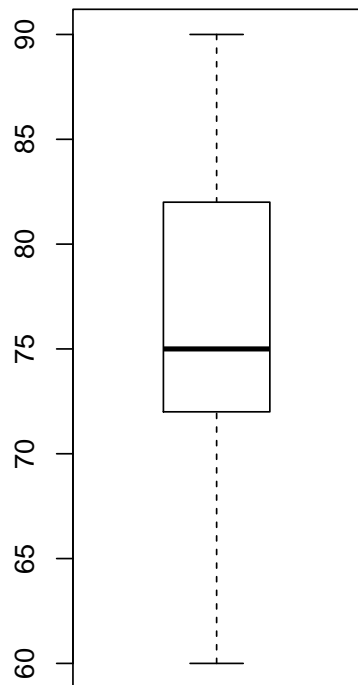
```
[1] 73 67 72 82 90 60 88 75 80
```

Question 1 (a)  $H_0 : \mu = 70$  against  $H_1 : \mu > 70$

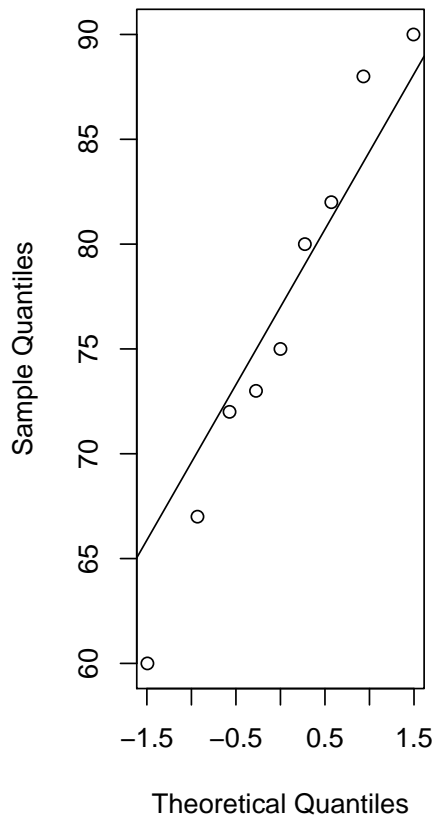
## Question 1 (b)

```
> par(mfrow = c(1, 2))
> boxplot(pulse.sf)
> title("Pulse of female student smokers")
> qqnorm(pulse.sf)
> qqline(pulse.sf)
```

**Pulse of female student smoke**



**Normal Q-Q Plot**



As the boxplot is approximately symmetric and the points in the normal qq-plot is close to a straight line, the normality assumption holds for the data.

**Question 1 (c)**

```
> smean = mean(pulse.sf)
> smean
```

[1] 76.33333

```
> ssd = sd(pulse.sf)
> ssd
```

[1] 9.708244

The mean is 76.333 and the sd is 9.708.

### Question 1 (d)

```
> t.test(pulse.sf, mu = 70, alt = "greater")
```

One Sample t-test

```
data: pulse.sf
t = 1.9571, df = 8, p-value = 0.04302
alternative hypothesis: true mean is greater than 70
95 percent confidence interval:
 70.31568      Inf
sample estimates:
mean of x
 76.33333
```

The test statistic is 1.9571 and the  $p$ -value is 0.0430. Since the  $p$ -value is less than 0.05, we reject  $H_0$  and conclude that there is evidence in the data against  $H_0$ . The pulse among female students who smoke is higher than 70.

### Question 1 (e)

```
> n = length(pulse.sf)
```

```
> n
```

```
[1] 9
```

```
> cv = qt(0.95, n - 1)
```

```
> cv
```

```
[1] 1.859548
```

```
> mu0 = 70
```

```
> rr = mu0 + cv * ssd/sqrt(n)
```

```
> rr
```

```
[1] 76.01765
```

The rejection region is sample mean  $> 76.0177$ . Since the sample mean falling in the rejection region (sample mean = 76.333  $>$  76.0177), we reject  $H_0$  and conclude that there is evidence in the data against  $H_0$ . The pulse among female students who smoke is higher than 70.

**Question 1 (f)** The 95% confidence interval for the true mean is (70.31568, infinity). Since the hypothesized mean  $\mu_0 = 70$  lies outside the confidence interval, we reject  $H_0$  and conclude that there is evidence in the data against  $H_0$ . The pulse among female students who smoke is higher than 70.

**Question 1 (g)** The three ways of testing the null and alternative hypotheses give consistent result.