Grelha de respostas certas

Versão A

Grupo	1					2						
	a)	b)	c)	d)i.	d)ii.	a)	b)i.	b)ii.	b)iii.	b)iv.	c)	d)
	D	B	D	C	A	B	B	C	A	B	C	B

Versão B

Grupo	1					2						
	a)	b)	c)	d)i.	d)ii.	a)	b)i.	b)ii.	b)iii.	b)iv.	c)	d)
	C	A	B	A	C	A	C	B	B	C	B	A

Resolução abreviada do 3º Teste

1. (a)
   - Variável pivot: $W = 10\dfrac{\bar{X}-\mu}{1.5} \overset{a}{\sim} N(0,1)$
   - $P(-a \le W \le a) \approx P(-a \le Z \le a) = 0.85 \Rightarrow a = z_{0.075} = 1.44$
   - $-1.44 \le 10\dfrac{\bar{X}-\mu}{1.5} \le 1.44 \Leftrightarrow \bar{X} - 0.216 \le \mu \le \bar{X} + 0.216$
   - $IC_{85\%}(\mu) \overset{a}{\equiv} \left[\bar{X} - 0.216, \bar{X} + 0.216\right]$
   - $IC_{85\%}(\mu) \overset{a}{=} [2.5 - 0.216, 2.5 + 0.216] = [2.284, 2.716]$

   (b)
   - Variável pivot: $W = \sqrt{n}\dfrac{\bar{X}-\mu}{1.5} \overset{a}{\sim} N(0,1)$
   - $P(-a \le W \le a) \approx P(-a \le Z \le a) = 0.95 \Rightarrow a = z_{0.025} = 1.96$
   - $-1.96 \le \sqrt{n}\dfrac{\bar{X}-\mu}{1.5} \le 1.96 \Leftrightarrow \bar{X} - \frac{2.94}{\sqrt{n}} \le \mu \le \bar{X} + \frac{2.94}{\sqrt{n}}$
   - $IC_{95\%}(\mu) \overset{a}{\equiv} \left[\bar{X} - \frac{2.94}{\sqrt{n}}, \bar{X} + \frac{2.94}{\sqrt{n}}\right]$
   - Amplitude de $IC_{95\%}$, $A_{95\%}(\mu) \overset{a}{=} \frac{5.88}{\sqrt{n}}$

     $A_{95\%}(\mu) \le 0.5 \Leftrightarrow \frac{5.88}{\sqrt{n}} \le 0.5 \Leftrightarrow \sqrt{n} \ge 11.76 \Leftrightarrow n \ge 138.2976 \quad n \ge 139$

   (c) $\hat{p} = \frac{10}{100} = 0.1$

   (d) i.
   - $H_0 : p = 0.2 \ vs \ H_1 : p \ne 0.2$
   - $W = 10\dfrac{\hat{P} - 0.2}{0.4} = 25\left(\hat{P} - 0.2\right) \underset{p=0.2}{\overset{a}{\sim}} N(0,1)$
   - $R_{0.2}(p) \overset{a}{=}]-\infty, -z_{0.1}[\cup]z_{0.1}, +\infty[=]-\infty, -1.28[\cup]1.28, +\infty[$
   - Rejeitamos H_0 ao nível de 20% de significância se $w_{obs} \in]-\infty, -1.28[\cup]1.28, +\infty[$

   ii.
   - $w_{obs} = 25(0.1 - 0.2) = -2.5$
   - $p - value = P(W < -2.5) + P(W > 2.5) \approx P(Z < -2.5) + P(Z > 2.5) =$
     $= 1 - P(Z \le 2.5) + 1 - P(Z \le 2.5) = 2 - 2P(Z \le 2.5)$

2. Seja X- peso/carcaça (em gramas). $X \sim N\left(\mu, \sigma^2\right)$

   Informação amostral: $n = 25,\ \bar{x} = 62.2,\ s^2 = 4$

   (a) $H_0 : \mu \ge 60 \ vs \ H_1 : \mu < 60$

   (b) i. $\sqrt{25}\dfrac{\overline{X} - 62}{2.2} \underset{\mu=62}{\sim} N(0,1)$

   $$T = 5\frac{\overline{X} - 62}{S} \underset{\mu=62}{\sim} t_{24}$$

   ii. $R_{0.2}(\mu) =]t_{24:0.2}, +\infty[=]0.857, +\infty[$

   iii. $t_{obs} = 5\frac{62.2-62}{\sqrt{4}} = 0.5$

iv. Não rejeitamos H_0 se $t_{obs} \leq 0.857$. Isto é, se $5\frac{\bar{x}-62}{\sqrt{4}} \leq 0.857 \Leftrightarrow \bar{x} \leq 62.3428$

(c)
- $X^2 = 24\dfrac{S^2}{\sigma^2} \sim \chi^2_{25-1} \equiv \chi^2_{24}$
- $P\left(a \leq X^2 \leq b\right) = 0.95$ e admitindo que $P\left(X^2 \leq a\right) = P\left(X^2 > b\right) = 0.025$, então

  $a = \chi^2_{24:0.975} = 12.4, \quad b = \chi^2_{24:0.025} = 39.4$
- $12.4 \leq 24\dfrac{S^2}{\sigma^2} \leq 39.4 \Leftrightarrow 24\dfrac{S^2}{39.4} \leq \sigma^2 \leq 24\dfrac{S^2}{12.4}$
- $IC_{95\%}\left(\sigma^2\right) \equiv \left[24\dfrac{S^2}{39.4}, 24\dfrac{S^2}{12.4}\right]$
- $IC_{95\%}\left(\sigma^2\right) = \left[24\dfrac{4}{39.4}, 24\dfrac{4}{12.4}\right] = \left[\dfrac{96}{39.4}, \dfrac{96}{12.4}\right]$

(d)
- $H_0 : \sigma^2 \geq 6.25 \;\; vs \;\; H_1 : \sigma^2 < 6.25$
- $X^2 = 24\dfrac{S^2}{6.25} \underset{\sigma^2=6.25}{\sim} \chi^2_{25-1} \equiv \chi^2_{24}$
- $x^2_{obs} = 24\dfrac{4}{6.25} = 15.36$
- $x^2_{obs} \notin R_{0.05}\left(\sigma^2\right) = \left]0, \chi^2_{24:0.95}\right[=]0, 13.8[$ Não rejeitamos H_0 com $\alpha = 5\%$

  $x^2_{obs} \in R_{0.1}\left(\sigma^2\right) = \left]0, \chi^2_{24:0.9}\right[=]0, 15.7[$ Rejeitamos H_0 com $\alpha = 10\%$

  $x^2_{obs} \notin R_{0.2}\left(\sigma^2\right) = \left]0, \chi^2_{24:0.8}\right[=]0, 18.1[$ Rejeitamos H_0 com $\alpha = 20\%$