Keys to Version A of Final Exam in MA 180/418, Fall 2010

Q1: **d** Q2: **c** Q3: **c** Q4: **d** Q5: **d**

Q6: **b** Q7: **b** Q8: **c** Q9: **a** Q10: **b**

Q11: (a) $\mu = 3.24$ and $\sigma = 1.68$.
(b) $3.24 - 2 \times 1.68 = -0.12$ and $3.24 + 2 \times 1.68 = 6.60$.
(c) unusual values: 7, 8, 9.

Q12: (a) 0.04.
(b) 0.08.
(c) 0.04.
(d) question (b).
(e) No, it is not unusually high, because 0.08>0.05.

Q13: (a) 7, 8, 9.
(b) None.
(c) No, they do not have to be the same.

Q14: (a) (0.642,0.738) by Table A-2 or by calculator function **1-PropZInt**
(b) yes because all the values in the interval exceed 0.5.

Q15: (a) $H_0 : p = 0.5$, $H_1 : p > 0.5$
(b) test statistic $z = 8.48$
(c) critical value $z = 2.575$ by Table A-2
(d) initial conclusion: accept H_1;
final conclusion: accept the original claim;
(e) The P-value is 0.000 (1.16×10^{-17} by technology).

Q16: (a) $n = \frac{(2.33)^2 \cdot 0.25}{0.02^2} = 3,393.06$, round up to $3,394$.
(b) $n = \frac{(2.33)^2 \cdot 0.26 \cdot 0.74}{0.02^2} = 2,611.3$, round up to $2,612$.

Q17: (a) $\bar{x} = 1.67$, $s = 0.71$, $Q_1 = 1.06$, $Q_3 = 2.05$
(b) $0.26 < \sigma^2 < 1.47$ (the right limit 1.48 is acceptable)
(c) the population must be normal; this requirement is strict.

Q18: (a) $H_0 : \mu = 5$, $H_1 : \mu < 5$
(b) test statistic $t = -1.31$
(c) critical value $t = -1.29$ by Table A-3
(d) initial conclusion: accept H_1;
final conclusion: accept the original claim;
(e) Either the population is normal or $n > 30$; this requirement is not strict.

[Bonus] The interval for the P-value is (0.05,0.10) by Table A-3
Exact P-value is 0.096 by calculator function **TTest**.

Q19: (a) $H_0: \sigma_1 = \sigma_2$, $H_1: \sigma_1 > \sigma_2$
(b) test statistic $F = 1.2825$
(c) critical value 1.7396 by Table A-5
(d) initial conclusion: accept H_0;
final conclusion: reject the original claim;
[Bonus] The P-value is 0.231 by calculator function **2-SampFTest**.
Accept H_0 because the P-value is high (> 0.05).

Q20: (a) $H_0: p_1 = p_2 = \cdots = p_7$, $H_1:$ not all p's are the same
(b) test statistic $\chi^2 = 11.5466$
(c) critical value 12.592 by Table A-4
(d) initial conclusion: accept H_0;
final conclusion: accept the original claim;
[Bonus] The interval for the P-value is (0.05,0.10) by Table A-4
Exact P-value is 0.073 by calculator function χ^2**GOF-Test** or χ^2**cdf**.