Keys to Version A of Midterm Test 2 in MA 180/418, Spring 2010

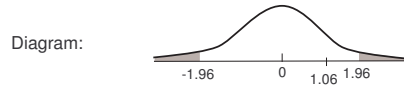Q1: **b**   Q2: **c**   Q3: **d**   Q4: **b**   Q5: **a**

Q6:   (a) H_0: $\mu = 0.85$, H_1: $\mu \neq 0.85$;   (b) critical values: ± 1.96

Diagram:

(c) test statistic: $z = 1.06$; we accept H_0.
    Final conclusion: the mean weight of all green M&Ms is equal to 0.85 g.
(d) P-value is 0.2892 (by Table A-2) or 0.2888 (by calculator);
    we accept H_0 because P-value$> \alpha = 0.05$.
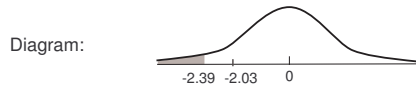
Q7:   (a) $0.2350 < p < 0.2950$.
    (b) it supports Mendel's theory, because the interval contains 0.25.

Q8:   (a) $\bar{x} = 830.6$, $s = 31.3$ (by calculator).
    (b) $21.14 < \sigma < 59.96$ by using the formula $\sqrt{\frac{8 \times (31.3)^2}{17.535}} < \sigma < \sqrt{\frac{8 \times (31.3)^2}{2.180}}$
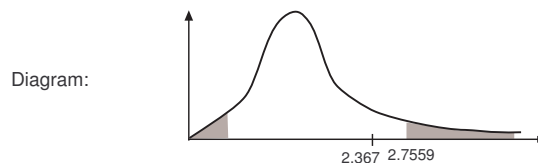   Chi-square (χ^2) distribution, $n - 1 = 8$ degrees of freedom.

Q9:   (a) H_0: $\mu_1 = \mu_2$, H_1: $\mu_1 < \mu_2$;   (b) critical value: -2.39

Diagram:

(c) test statistic: $t = -2.03$; we accept H_0 (reject the original claim).
(d) P-value is between 0.01 and 0.025 (by Table A-3) or 0.022 (by calculator).

Q10:   (a) H_0: $\sigma_1^2 = \sigma_2^2$, H_1: $\sigma_1^2 \neq \sigma_2^2$;   (b) critical value: 2.7559

Diagram:

(c) test statistic: $F = 2.367$; we accept H_0 (and the original claim).
(d) P-value is between 0.05 and 0.1 (by Table A-5) or 0.094 (by calculator).