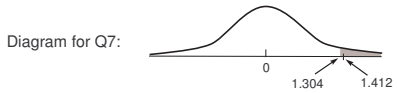
Keys to Version A of Midterm Test 3 in MA 180/418, Spring 2011

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

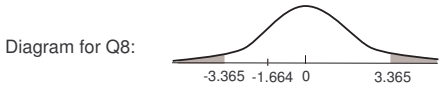
Q6: (a) The interval is $(-0.074, -0.015)$ by formula (with $z_{\alpha/2} = 1.28$)
same interval by calculator function **2-PropZInt**.
(b) Yes, because the confidence interval does not contain zero.

Q7: (a) $H_0 \colon \mu_1 = \mu_2$, $H_1 \colon \mu_1 > \mu_2$; (b) test statistic: $t = \frac{57-48}{\sqrt{24^2/40+38^2/55}} = 1.412$



(c) critical value: 1.304 (from Table A-3 with df=39).
(d) we accept H_1. We accept the original claim.
[Bonus] P-value is 0.0807 by calculator function **2-SampTTest**.
By Table A-3, the P-value is between 0.05 and 0.1.
We accept H_1 because P-value$< \alpha = 0.1$.

Q8: (a) $H_0 \colon \mu_d = 0$, $H_1 \colon \mu_d \neq 0$; (b) test statistic: $t = -1.664$



(c) critical values: ± 3.365 (from Table A-3 with df=5).
(d) we accept H_0. There is no difference.
[Bonus] P-value is 0.1569 by calculator function **T-Test**.
By Table A-3, the P-value is between 0.1 and 0.2.
We accept H_0 because P-value$> \alpha = 0.02$.

Q9: (a) $r = 0.702$ by calculator function **LinRegTTest**;
(b) The critical value is 0.811 from Table A-6.
There is no linear correlation.
(c) $\hat{y} = -15.7734 + 1.1946\, x$ by calculator function **LinRegTTest**;

Q10: (a) $-15.7734 + 1.1946 \cdot 100 = 103.7$
(b) $\bar{y} = 107.7$
(c) the best predicted pressure is $\bar{y} = 107.7$
We use $\bar{y}$ because there is no linear correlation; see Q9, part (b).