**ChE 320\_Spr\_17\_HW 6 Solution**

**4-28**

a) 

b) 

c) 

d) 

e) 

**4-36**

(a) The sample mean is the mid-point of the two intervals, or sample mean = 50.00.

(b) The wider interval is the 95% CI, and that is (38.02, 61.98).

**4-40**

a) (1) The parameter of interest is the true mean ppm of benzene, μ.

(2) H0: μ = 7980

(3) H1: μ < 7980

(4) Test statistic is

(5) Reject H0 if z0 <  where = 2.33

(6) = 7906, σ = 80



(7) The P-value = Φ(-2.925) ≅ 0.00172. Because the P-value < 0.01, we reject the null hypothesis and conclude that the exit water meets the federal regulation.

b) 

c) (page 175) Set β = 1 − 0.90 = 0.10

n =  =  ≅  = 23.29,

n ≅ 24.

d) (Equation4-37) For α = 0.01, zα = z0.01 = 2.33





μ ≤ 7965

e) The confidence interval constructed does not contain the value 7980. We conclude that the manufacturer’s exit water meets federal regulation using a 0.01 level of significance.

**4-46**

zα/2 = z0.005 = 2.58, E = 15

(Equation4-36), n ≅ 30.

**4-48** (t-table/ Table II in textbook)

a) P-value = 2\*P(t > 2.48): for degrees of freedom of 9 we obtain

2(0.01) < P-value < 2(0.025) = (0.02 < P-value < 0.05)

b) P-value = 2\*P(t > |-3.95|): for degrees of freedom of 9 we obtain

2(0.001) < P-value < 2(0.0025) = (0.002 < P-value < 0.005)

c) P-value = 2\*P(t > 2.69): for degrees of freedom of 9 we obtain

2(0.01) < P-value < 2(0.025) = (0.02 < P-value < 0.05)

d) P-value = 2\*P(t > 1.88): for degrees of freedom of 9 we obtain

2(0.025) < P-value < (0.05) = (0.05 < P-value < 0.10)

e) P-value = 2\*P(t > |-1.25|): for degrees of freedom of 9 we obtain

2(0.10) < P-value < 2(0.25) = (0.20 < P-value < 0.50)

**4-50**

a) 



**One-Sample T: X**

Test of mu = 91 vs not = 91

Variable N Mean StDev SE Mean 95% CI T P

X 25 92.5805 2.3365 0.4673 (91.6160, 93.5450) 3.38 0.002

The null hypothesis can be rejected at the 0.05 level because the P-value = 0.002 < 0.05.

b) It is a two-sided test.

c) The null hypothesis is rejected at the 0.05 level because 90 is not included in the 95% CI

d) 99% CI





e) P-value = P(t > 3.38): for degrees of freedom of 24 we obtain 0.001 < P-value < 0.0025

**4-56**

In order to use t statistics in hypothesis testing, we need to assume that the underlying distribution is normal.

1) The parameter of interest is the true Izod impact strength, μ.

2) H0: μ = 1.0

3) H1: μ > 1.0

4) t0 = 

5) Reject H0 if t0 > tα,n-1  where t0.01,19 = 2.539

6) = 1.121 s = 0.328 n = 20

t0 = 

7) Because 1.65 < 2.539, fail to reject the null hypothesis. There is not sufficient evidence to conclude that the true Izod impact strength is greater than 1.0 ft-lb/in at α = 0.01.

**4-64**

The parameter of interest is the true mean natural frequency, μ.

For α = 0.10 and n = 5, tα/2,n-1 = t0.05,4 = 2.132

= 231.67 s = 1.53

90%CI: 

230.21 ≤ μ ≤ 233.13

With 90% confidence, the true mean frequency is between 230.21 Hz and 233.13 Hz. There is strong evidence that the mean natural frequency **differs** from 235.