Mixed Inference for Means Practice

Use a separate sheet of paper. You must show all work and all steps must be clearly labeled. Submitting just answers will result in a grade of 0! All unexplained numbers will be ignored and final answers must be written in complete sentences.

1. The *Edison Electric Institute* has published figures on the annual number of kilowatt-hours expended by various home appliances. It is claimed that a vacuum cleaner expends an average of 46 kw/h per year. If a random sample of 12 homes indicates that vacuum cleaners expend an average of 42 kw/h per year with a standard deviation of 11.9 kw/h, does this suggest that vacuum cleaners expend less than 46 kw/h annually? It is safe to assume the population is approximately normal.

2. Two types of instruments for measuring the amount of sulfur monoxide in the atmosphere are being compared in an air-pollution experiment. The following readings were recorded for the two instruments on randomly selected air samples.

Instrument A	0.86	0.82	0.75	0.61	0.89	0.64	0.81	0.68	0.65
Instrument B	0.87	0.74	0.63	0.55	0.76	0.70	0.69	0.57	0.53

   Are the instruments measuring the same amount of sulfur monoxide?

3. According to *Chemical Engineering* an important property of fiber is its water absorbency. The average percent absorbency of 25 randomly selected pieces of cotton fiber was found to be 20 with a standard deviation of 1.5. A random sample of 25 pieces of acetate yielded an average percent of 12 with a standard deviation of 1.25. Build an 80% confidence interval for the true difference in average percent absorbency.

4. A manufacturer of sports equipment has developed a new synthetic fishing line. A random sample of 50 lines is tested and found to have a mean breaking strength of 7.8 kilograms with a standard deviation of 0.5 kilograms. Build a 96% confidence interval for the true mean breaking strength.

5. Nine subjects were used in an experiment to determine if an atmosphere involving exposure to carbon monoxide has an impact on breathing capability. The subjects were exposed to breathing chambers, one of which contained a high concentration of CO. The subjects were exposed to the breathing chambers in random sequence. The following data give the breathing frequency in number of breaths taken per minute.

Subject	1	2	3	4	5	6	7	8	9
With CO	30	45	26	25	34	51	46	32	30
Without CO	30	40	25	23	30	49	41	35	28

   Is the breathing frequency the same for the two environments?

6. A study was conducted by the Department of Zoology at Virginia Tech to determine if there is a significant difference in the density of organisms at two different stations located on Cedar Run. The following gives the density measurements, in number of organisms per square meter, at two different collecting stations at random selected times.

   Station I: 5030 13,700 10,730 11,400 860 2200 4250 15,040 4980 11,910
   8130 26,850 17,660 22,800 1130 1690

   Station II: 2800 4670 5890 7720 6030 7330 2810 1330 4220 1230
   2130 2190

   Can we conclude that the average densities at the two stations are equal?