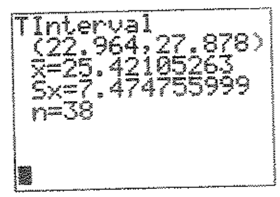
17.28. **(a)** Use df = 26:

$$114.9 \pm 2.056\left(\frac{9.3}{\sqrt{27}}\right) = 111.2 \text{ to } 118.6 \text{ mm Hg}.$$

(b) The essential assumption is that the 27 men tested can be regarded as an SRS from a population, such as all healthy white males in a stated age-group. The assumption that blood pressure in this population is Normally distributed is *not* essential because $\bar{x}$ from a sample of size 27 will be roughly Normal in any event, provided the population is not too greatly skewed and has no outliers.



17.32. SOLVE: The mean is $\bar{x} \doteq 25.42°$ and the standard deviation is 7.47°, and t^* is either 2.042 (using df = 30 from Table C) or 2.0262 (using df = 37 from software). The confidence interval is nearly identical in both cases:

$$\bar{x} \pm t^*\left(\frac{s}{\sqrt{38}}\right) = 22.95° \text{ to } 27.89° \quad (t^* = 2.042), \text{ or}$$

$$= 22.96° \text{ to } 27.88° \quad (t^* = 2.0262).$$

CONCLUDE: We are 95% confident that the mean HAV angle among such patients is between 22.95° and 27.89°.

17.38. **(a)** Weather conditions that change from day to day can affect spore counts. So the two measurements made on the same day form a matched pair. **(b)** Take the differences, kill room counts minus processing counts. For these differences, $\bar{x} = 1824.5$ and $s \doteq 834.1$ CFUs/m^3. For the population mean difference, the 90% confidence interval for μ is

$$1824.5 \pm 2.353\left(\frac{834.1}{\sqrt{4}}\right) = 1824.5 \pm 981.3 = 843.2 \text{ to } 2805.8 \text{ CFUs/m}^3.$$

The interval is wide because the sample is small (four days), but we are confident that mean counts in the kill room are quite a bit higher. **(c)** The data are counts, which are at best only approximately Normal, and we have only a small sample ($n = 4$).

18.36. **(a)** Based on the stemplots, the t procedures should be safe. Both the stemplots and the means suggest that customers stayed (very slightly) longer when there was no odor. **(b)** Testing H_0: $\mu_N = \mu_L$ vs. H_a: $\mu_N \neq \mu_L$, we find SE $\doteq$ 3.9927 and $t \doteq 0.371$. This is not at all significant: $P > 0.5$ (df = 27) or $P = 0.7121$ (df = 55.4). We cannot conclude that mean time in the restaurant is different when the lemon odor is present.

	n	$\bar{x}$	s
No odor	30	91.2667	14.9296
Lemon	28	89.7857	15.4377

No odor		Lemon
	5	6
	6	03
98	6	
322	7	34
965	7	58
44	8	33
7765	8	8889
32221	9	0144
86	9	677
31	10	14
9776	10	5688
	11	23
85	11	
1	12	

19.40. PLAN: We will give a 95% confidence interval for the proportion p of female Hispanic drivers in Boston who wear seat belts.

```
1-PropZInt
 (.4918,.67059)
 p̂=.5811965812
 n=117
```

```
1-PropZInt
 (.49053,.6665)
 p̂=.5785123967
 n=121
```

SOLVE: We have a fairly large SRS from a much larger population, with counts 68 and 49, so both large-sample and plus four methods are safe. For the large-sample interval: $\hat{p} = \frac{68}{117} \doteq 0.5812$, $SE_{\hat{p}} \doteq 0.04561$, the margin of error is $1.960 SE_{\hat{p}} \doteq 0.08940$, and the 95% confidence interval is 0.4918 to 0.6706.
Using plus four methods: $\tilde{p} = \frac{70}{121} \doteq 0.5785$, $SE_{\tilde{p}} \doteq 0.04489$, the margin of error is $1.960 SE_{\tilde{p}} \doteq 0.08798$, and the 95% confidence interval is 0.4905 to 0.6665.
CONCLUDE: With either method, we are 95% confident that the proportion of female Hispanic drivers who wear seat belts is between about 0.49 and 0.67.

19.42. PLAN: Let p be the proportion of Hispanic female drivers who wear seat belts. Because the exercise asks if we are convinced that more than half wear seat belts, we will test H_0: $p = 0.5$ vs. H_a: $p > 0.5$; one might instead choose the two-sided alternative $p \neq 0.5$.
SOLVE: Large-sample inference procedures can be used: we view our sample as an SRS, and the expected counts np_0 and $n(1 - p_0)$ are both 58.5. With $\hat{p} \doteq 0.5812$, the test statistic is $z = (0.5812 - 0.5)/\sqrt{\frac{(0.5)(0.5)}{117}} \doteq 1.76$. The P-value is 0.0392 (from Table A) or 0.0395 (software).
CONCLUDE: We have pretty strong evidence—significant at $\alpha = 0.05$, though not at $\alpha = 0.01$—that a majority of Hispanic female drivers in Boston wear seat belts. (If we had chosen a two-sided alternative, the P-value would be twice as big, and the evidence would not be significant at $\alpha = 0.05$.)

19.44. STATE: For estimating seat belt usage among Hispanic females with 95% confidence, how large a sample is needed to reduce the margin of error to ±0.05?
PLAN: We seek n so that $z^* \sqrt{\frac{p^*(1-p^*)}{n}} = 0.05$, where p^* is our preliminary estimate of the unknown proportion p.
SOLVE: We estimate p using the value of $\hat{p}$ found in the first sample: $p^* = \hat{p} = \frac{68}{117} \doteq 0.5812$. To achieve the desired margin of error, we need $n = \left(\frac{1.96}{0.05}\right)^2 p^*(1 - p^*) \doteq 374.03$.
CONCLUDE: A sample size of $n = 375$ Hispanic female drivers will result in a margin of error of approximately ±0.05 for estimating seat belt usage.