4) $H_0 : \mu = 100$

Speeds are

100.5, 101.3, 99.5, 98.6, 104.0, 103.1, 100.5, 99.8, 98.6, 102.4

$\mu = 100.83$

$$\sigma = \sqrt{\frac{\Sigma (x_i - \mu)^2}{N}}$$

$(x_i - \mu)^2 = 0.1089 + 0.2209 + 1.7689 + 4.9729 + 10.0489 + 5.1529 + 0.1089 + 1.0609 + 4.9729 + 2.4649$

$$\sigma = \sqrt{\frac{30.881}{10}} = \sqrt{3.0881} = 1.7573 \quad V = 10 - 1 = 9$$

At 95%. $\alpha = 0.05 \Rightarrow \frac{\alpha}{2} = 0.025$

$$\bar{x} - t_{n-1, \alpha/2} \frac{S}{\sqrt{n}} \leq \mu \leq \bar{x} + t_{n-1, \alpha/2} \frac{S}{\sqrt{n}}$$

$$100.83 - 2.262 \cdot \frac{1.7573}{\sqrt{10}} \leq \mu \leq 100.83 + 2.262 \cdot \frac{1.7573}{\sqrt{10}}$$

$$99.5 \leq \mu \leq 102.1$$

At 95% of confidence the speed μ between 99.5 to 102.1 mph

5) $\mu = 105$

$H_1 : \mu_1 \neq 105$

$\bar{x} = 125$

$S = 14$

$n = 25$

$d.f = 24 - 1 = 23$

$\alpha = 95\%$

$$t = \frac{\bar{x} - \mu_0}{S/\sqrt{n}} = \frac{125 - 105}{14/\sqrt{25}} = \frac{20}{2.8} = 7.$$

$t_{tab} = 2.064$, $t_{calculd} = 7.14$

$t_{calc} > t_{tab}$

6) Null hypothesis H_0 $\mu = 13$

Alternate Hypothesis H_1, $\mu \neq 13$

Given

$\bar{x} = 15.5$

$\mu_0 = 13$

$n = 169$

$\sigma = 13$

$$z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$$

$$\frac{15.5 - 13}{13/\sqrt{169}} = 2.15$$

$z > 1.96$ Null hypothesis rejected