(1) $n = 50 \quad \bar{x} = 2500 \quad \sigma = 196 \quad \alpha = 0.08$

$$\bar{x} \pm \frac{\sigma}{\sqrt{n}} \; z_{\alpha/2}$$

$$2500 \pm \frac{196}{\sqrt{50}} \times 1.751 \Rightarrow 2500 \pm 48.535$$

$$(2451.465, 2548.535)$$

I believe we are 92% confident that the true average strength of the concrete will lie below 2451.465 and 2548.535

(2) $n = 19 \quad \bar{x} = 105 \quad s = 4.5 \quad \alpha = 0.04$

$$105 \pm \frac{4.5}{\sqrt{19}} \times 2.214 \Rightarrow 105 \pm 2.2857$$

$$(102.714, 107.2857)$$

I believe we are 96% confident that the mean weight of all the bags that are filled with machine lies between 102.714 and 107.2857.

(3) $\alpha = 0.02 \quad x = 36 \quad n = 45 \quad p = 0.7$

$$0.8 \pm 2.33 \sqrt{\frac{0.8 \times 0.2}{45}} \Rightarrow 0.8 \pm 0.1389 = (0.6611, 0.9389)$$

I am 98% confident that the proportion of successful loads lies between 0.6611 and 0.9389.

(4) There is no estimate of proportion of given, so lets assume that it is 0.5

$ME = 0.4$, $p = 0.5$, $CL = 0.98$, $\alpha = 0.02$

$Z|\alpha|_2 = 2.326$

$$n = \frac{(2.326)^2 \times (0.5)(1-0.5)}{(0.04)^2} = 845.355625$$

The Required sample size = 845

(5) $\mu = 2.60$, $n = 12$, $\bar{x} = 2.57$, $\sigma = 0.144$

- $H_0 = \mu = 2.60$ vs $H_1: \mu < 2.60$
- Test statistic $= \frac{2.57 - 2.60}{0.144/\sqrt{12}} = -0.722$
- P-value = 0.2427
- Since P-value > 0.05, we do not reject $H_0$.
- Conclusion = There is no sufficient evidence to support the claim that $\mu < 2.60$