1. A random sample of 400 hospital admissions from a week's total of 5400 finds 88 were emergency contacts. Give a 98% confidence interval for $p = \text{rate of emergency contacts among admissions}.$

$$\hat{p} = \frac{88}{400} = \frac{22}{100} = 0.22$$

DF

$$\infty \quad 1.96 \quad 2.326$$

Conf 95% 98%

$$\hat{p} \pm z \frac{\sqrt{\hat{p}(1-\hat{p})}}{\sqrt{n}} \sqrt{\frac{N-n}{N-1}}$$
2. A random sample of 36 elk selected from the Jackon, Wy. Elk Refuge in winter are scored for $x =$ lead exposure finding sample mean $\bar{x} = 27.6$

sample standard deviation $s = 11.4$

It is believed that $x$ scores in this winter herd are **normal distributed**. Give the 80% confidence interval for population mean lead exposure $\mu$.

$$\text{DF} \quad 35 \quad 1.306 \quad \bar{x} \pm t \frac{s}{\sqrt{n}} \quad (1)$$

$$\infty \quad \text{Conf} \quad 80\%$$
3. What does estimated margin of error of $\bar{x}$ actually estimate?

population sd $\sigma$
sd of the list of all possible $\bar{x}$
1.96 $\sigma$
1.96 sd of the list of all possible $\bar{x}$
4. We have obtained estimated standard errors for rates of cracking of concrete.
- 0.037 for $\hat{p}_{\text{mixes with latex}}$
- 0.042 for $\hat{p}_{\text{mixes without latex}}$

Give the estimated margin of error for

$\hat{p}_{\text{latex}} - \hat{p}_{\text{no latex}}$

$$1.96 \sqrt{0.037^2 - 0.042^2}$$
5. We have obtained estimated standard errors for sample means of concrete hardness

\[ 0.037 \text{ for } \bar{x}_{\text{mixes with latex}} \]
\[ 0.042 \text{ for } \bar{x}_{\text{mixes without latex}} \]

Give the estimated margin of error for \( \bar{x}_{\text{latex}} - \bar{x}_{\text{no latex}} \).

\[ 1.96 \sqrt{0.037^2 - 0.042^2} \]
6. Estimate the mean and sd by eye.
7. Amount of genetic material in a given plot is normal distributed with

\[ \mu = 9 \quad \sigma = 3 \]

Determine the standard score \( z \) of a plot with score \( x = 10.5 \).

Determine the amount \( x \) of genetic material of a plot with standard score \( z = 2.5 \).
8. What is the **exact chance** that a 95% confidence interval for \( \mu \) will in fact cover \( \mu \) if the population is normal distributed and the t-CI is used?
9. Use the $z$-table to determine $P(Z < 2.43)$.

\[
\begin{array}{cc}
  z & 0.03 \\
  2.4 & 0.9925 \\
\end{array}
\]
10. Determine the 86th percentile of Z.

\[
z \quad 0.08
\]
\[
1.0 \quad 0.8599
\]

IQ is normal distributed and has mean 100 and sd 15. Determine the 86th percentile of IQ.

\[
IQ = 100 + z \times 15
\]
11. Determine the 86th percentile of $Z$. Calculate the sample standard deviation $s$ for the list $x = \{0, 0, 4, 8\}$.

$\text{avg} = \frac{12}{4} = 3$

$$s_x = \sqrt{\frac{(0-3)^2+(0-3)^2+(4-3)^2+(8-3)^2}{4-1}} = 3.82971$$

$$s_{4x+9} = |4|s_x = 4 \times (3.82971)$$
12. We've selected random samples of people with or without medication, the score being \( x = \) blood pressure decrease over a 5 minute period. Assume large populations.

\[
\begin{align*}
\bar{x}_{\text{with med}} &= 12.3 \quad s_{\text{with med}} = 3.2 \quad n = 60 \\
\bar{x}_{\text{without med}} &= 3.7 \quad s_{\text{without med}} = 1.2 \quad n = 90
\end{align*}
\]

Give the 95% CI for \( \mu_{\text{with med}} - \mu_{\text{without med}} \).

\[
(12.3 - 3.7) \pm 1.96 \sqrt{\frac{3.2^2}{60} + \frac{1.2^2}{90}}
\]