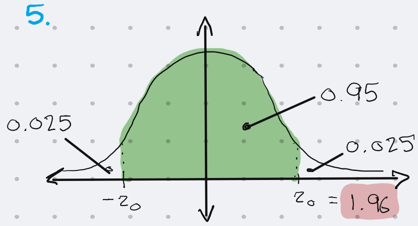
ESTIMATING THE MEAN HANDOUT

*TI-84 Plus CE

4. stat > list > rand(0, 9, 25)

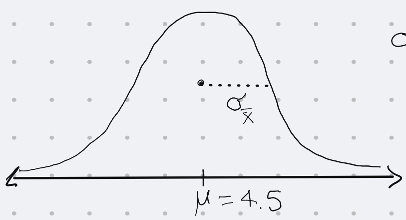
$\bar{x} = 5.12$

5.



invNorm(0.025, 0.1, LEFT) = 1.96

6. $\bar{x} \pm 1.96\,\sigma_{\bar{x}}$



$\sigma_{\bar{x}} = \dfrac{\sqrt{?}}{\sqrt{25}}$

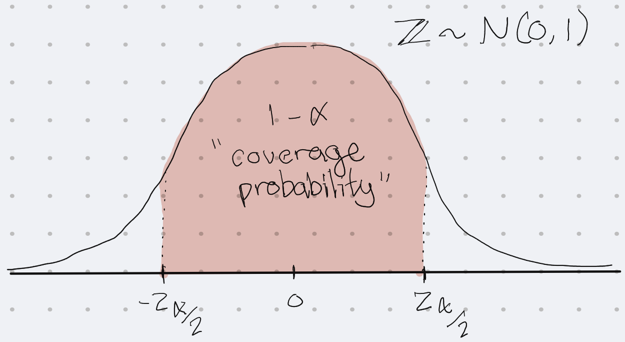
7. b. You cant solve directly because we don't know the true mean. ∴ we use sample mean...

$P\left(\bar{x} - 1.96\frac{\sigma}{\sqrt{n}} < \mu < \bar{x} + 1.96\frac{\sigma}{\sqrt{n}}\right) = 0.95$

$\bar{x} \pm 1.96\frac{\sigma}{\sqrt{n}} = (5.12) \pm \frac{(\quad)}{\sqrt{(25)}} = 3.99$ or 6.25

c. 95% confidence that μ (true mean) is between 3.99 & 6.25

Confidence Intervals Handout



$\bar{x} \pm z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$ "$1-\alpha$ confidence interval"

No longer able to speak to probability (technically) because we have taken a sample, aka **collapsed the probability**. Therefore we talk about "confidence"

Example: Finding an 80% confidence interval

$1-\alpha = 0.8$

$\alpha = 0.2$

$\frac{\alpha}{2} = 0.1$

$z_{\frac{\alpha}{2}} = 1.28$

$\bar{x} = 299{,}795 \text{ km/s}$

$\sigma = 8 \text{ km/s}$

$n = 16$

$$80\% \text{ confidence interval} = 299{,}795 \pm 1.28 \frac{\sigma}{\sqrt{n}}$$

$$= 299{,}795 \pm 1.28 \frac{(8)}{\sqrt{(16)}}$$

$$= (299{,}792.44 \text{ km/s},\ 299{,}797.56 \text{ km/s})$$