The "find n confidence interval" problem

You may see problems (eg 8b on WW#3) which ask you to solve for n in a CI setting. Here is how you do it.

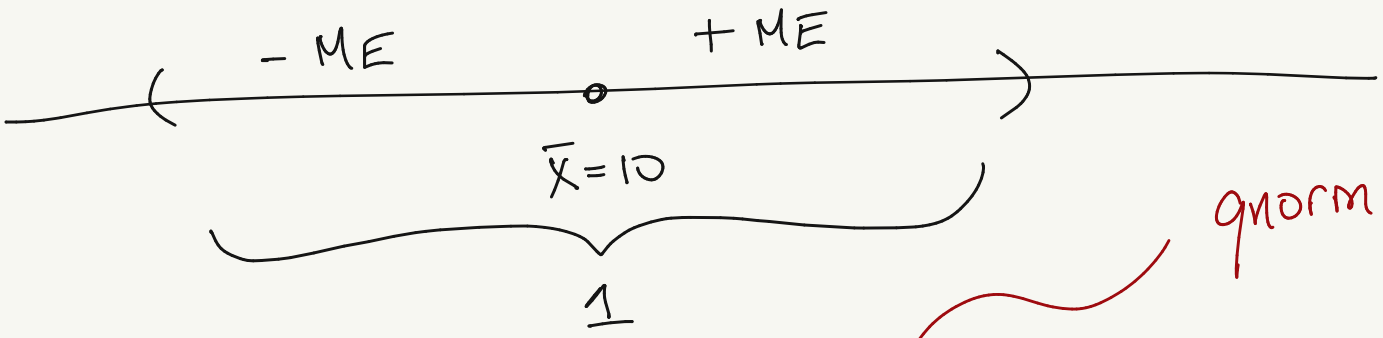
Start with the formula:

$$\bar{x} \pm z^* \cdot \frac{\sigma}{\sqrt{n}}$$

ME

↳ then the question always turns into something about the ME.

Ex: for a CI problem with $\bar{X} = 10$, $\sigma = 2$ and 95% confidence, find n so the entire CI is no more than 1 wide.



α

$0.95 + \frac{0.05}{2}$

qnorm(0.975)

$$\therefore \quad \frac{1}{2} = ME = z^* \cdot \frac{\sigma}{\sqrt{n}} = 1.960 \cdot \frac{2}{\sqrt{n}}$$

$$\therefore \quad 0.5 \cdot \sqrt{n} = 2 \cdot 1.960$$

$$\therefore \quad \sqrt{n} = 7.84 \implies n = 61.4656$$

ALWAYS ROUND UP

$\therefore n = 62$