If X is a Normal random variable with parameters μ_X, σ_X^2,
then claim $\frac{X-\mu_X}{\sigma_X}$ is a standard normal random variable.

First, $\frac{X-\mu_X}{\sigma_X} = \left(\frac{1}{\sigma_X}\right) X - \left(\frac{\mu_X}{\sigma_X}\right)$ then it is a normal random variable.

Also $E\left(\frac{X-\mu_X}{\sigma_X}\right) = \frac{E(X-\mu_X)}{\sigma_X} = \frac{E(X)-\mu_X}{\sigma_X} = 0$

$\mathrm{Var}\left(\frac{X-\mu_X}{\sigma_X}\right) = \frac{1}{\sigma_X^2}\mathrm{Var}(X-\mu_X) = \frac{1}{\sigma_X^2}\mathrm{Var}(X) = 1$

So $\frac{X-\mu_X}{\sigma_X}$ must not just be any normal random variable,
but moreover a standard normal random variable.

We must always remember to convert Normal random variables
to standard normal random variables when using the CDF chart.

E.g. Say X is a normal random variable with $\mu_X = 9$, $\sigma_X^2 = 5^2 = 25$
i.e. $\sigma_X = 5$

Find $P(X \le 12) = P\left(\frac{X-9}{5} \le \frac{12-9}{5}\right)$

$= P(Z \le \frac{3}{5}) = P(Z \le .6) = \boxed{.7257}$

$= F_Z(.6)$

from the CDF table for standard normal random variables