

Review

$$z_x = \frac{x - \mu_x}{\sigma_x}$$

for sample sizes ≥ 30
(typically)

If sample is smaller
use t distribution. Good
till about $n = 5-10$, then use
exact methods or graph

SPSS

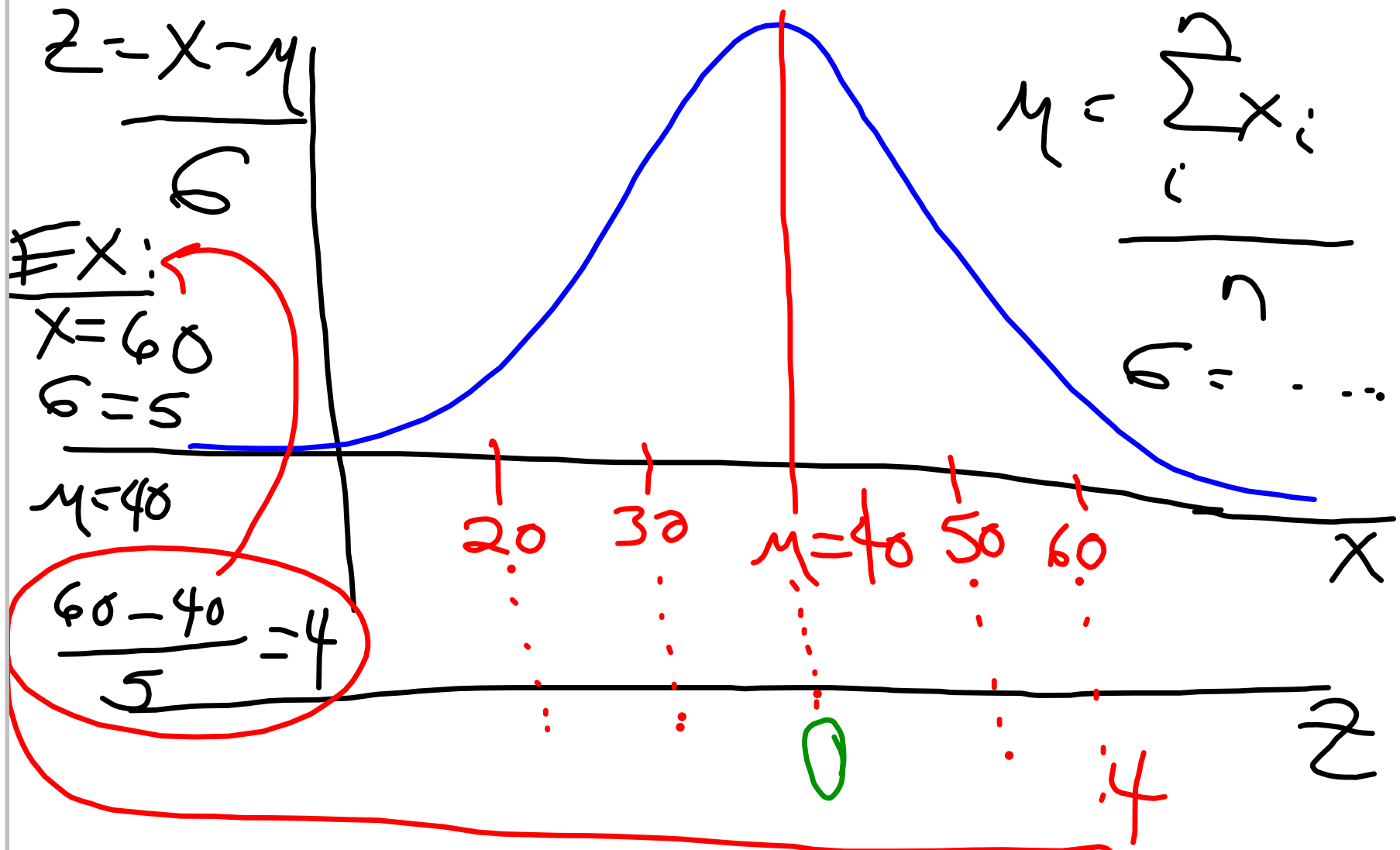
(1) How to produce z-scores

↳ Analyse → Descriptives

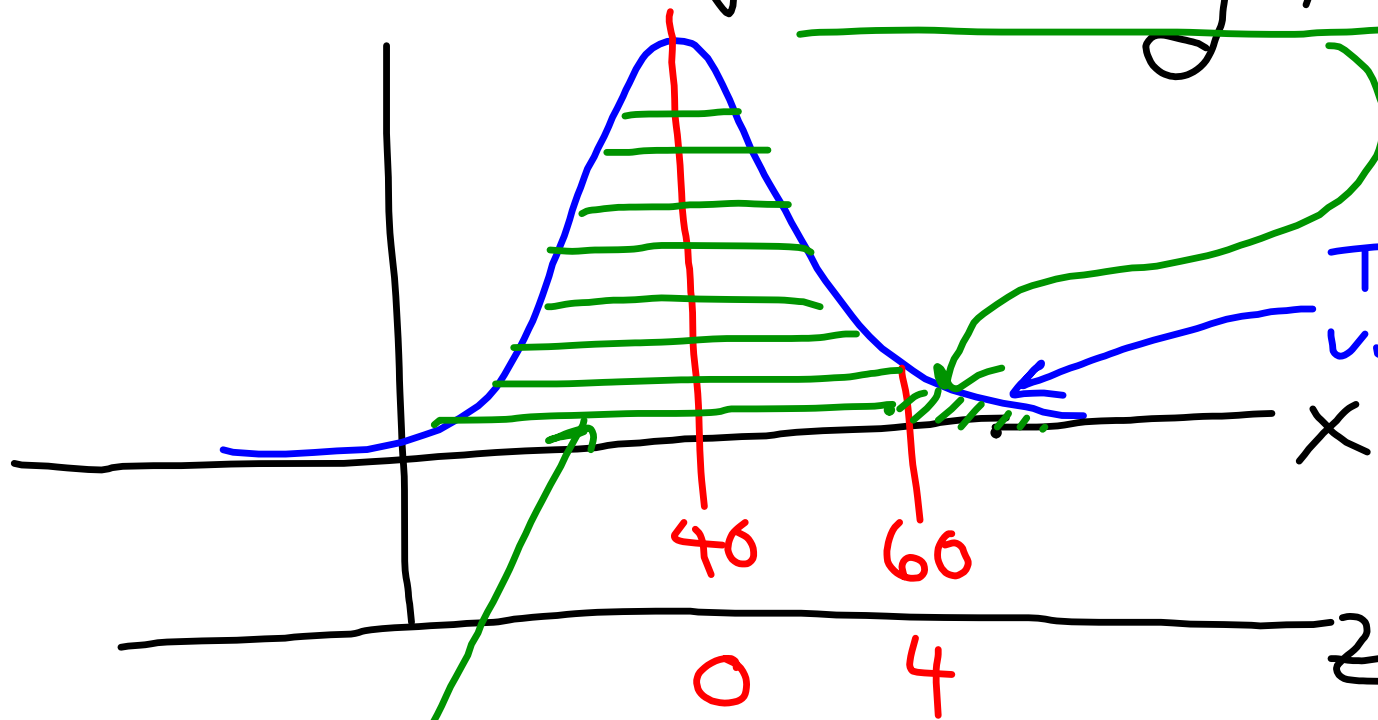
→ check box for save
standardized values

→ Pick variables of interest
and move to compute box

Distribution Examples



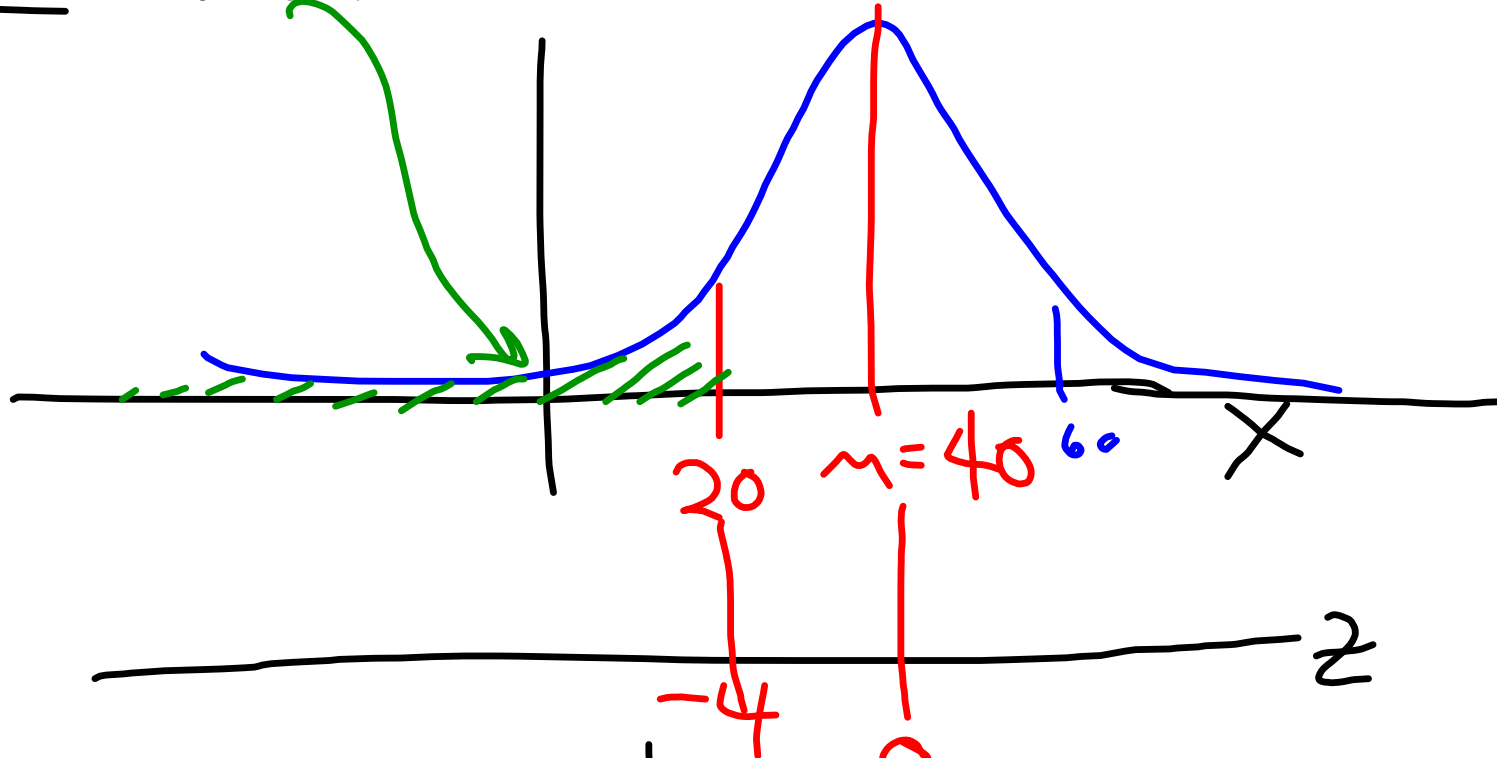
What is the probability $X > 60$



To find area
under curve
look at
z or t
table
as
appropriate

$$\text{prob} < 60 \sim .999$$
$$\text{Prob} > 60 \sim 1 - .999 \sim 0$$

Ex: Prob $X \leq 20$



$$z = \frac{X - \mu}{\sigma} = \frac{20 - 40}{6} = \frac{-20}{6} = -4$$

EX: Caregivers

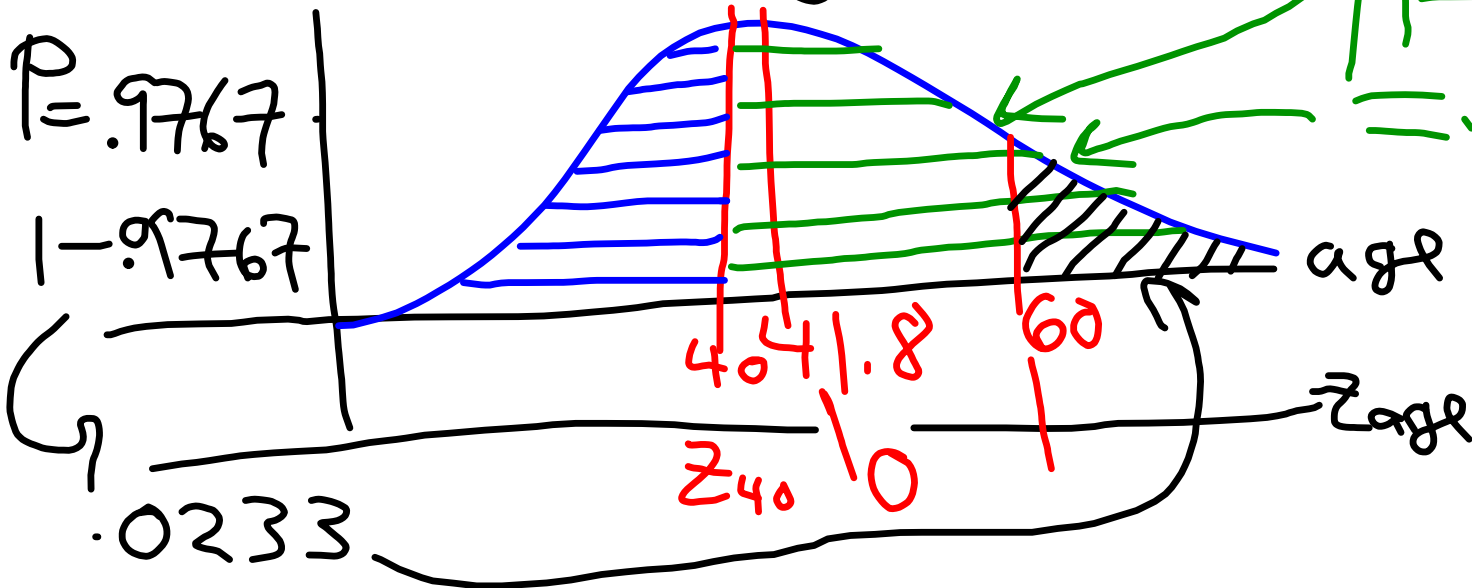
$$z_{40} = \frac{40 - 41.85}{9.089}$$

$$\text{Prob}(\text{age} > 40) = -0.2035$$


$$z_{60} = \frac{60 - 41.85}{9.089} \text{ Prob}(\text{age} < 40) \quad P = .4207$$

$$= 1.9969 \text{ Prob}(\text{age} \geq 60)$$

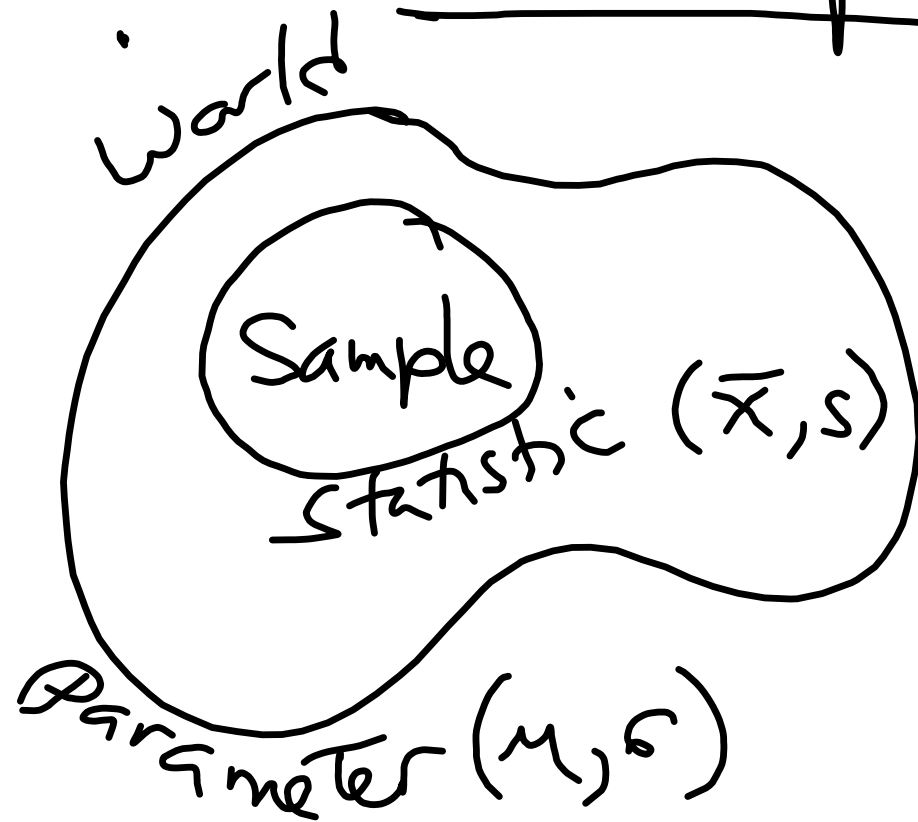
$$1 - .4207 = .5793$$



Z - Problems

- (1) Find μ and σ of data set variable(s) of interest
- (2) Draw picture 
- (3) Define area of interest (shade)
- (4) Compute z for x value of interest
- (5) Use z table to find probability
- (6) Carefully compute required probability

Sampling



(1) is sample representative of world

World = all events that can happen
Sample = events of interest

World = all events that can happen
Sample = events of interest

Prob(an event can happen) =

$$= \frac{\# \text{ of ways event can happen}}{\# \text{ of ways can happen} + \# \text{ of ways can't happen}}$$

EX: (cards) P(pulling red card)

$$P(\text{red}) = \frac{26}{26 + 26} = .5$$

$$\underline{\text{EX:}} \quad P(\text{a queen}) = \frac{4}{4 + 48}$$

$$= \frac{4}{52}$$

$$\underline{\text{EX:}} \quad P(\text{red jack}) = \frac{2}{52}$$

$$\underline{\text{EX:}} \quad P(\text{snake eyes}) = \frac{1}{36}$$

$$\underline{\text{EX:}} \quad P(\text{any pair}) = \frac{6}{36}$$

Probability Sampling

(1) Simple random sampling

↳ hat draw

↳ lottery

(2) Random ~~it~~ draw