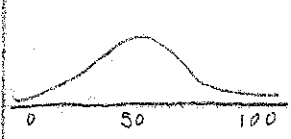
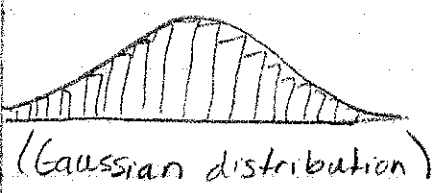


10/6 Graphical Interpretation of SD.

Empirical Rule • Start at the mean of a data set, then go 1 SD either way. you will typically find that about $\frac{2}{3}$ rds or 68% of the data will be in this range. Within 2 SD's most 95% will be in this range. With 3 SD's almost all the data 99.7% will be in this range.

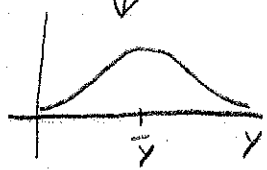


Guessing the SD: 1 is way to small, 50 is way to big. 15 sounds about right



Bernoulli (1640 to 1700)
Gauss (early 1800's)
Pretetlet (1850)

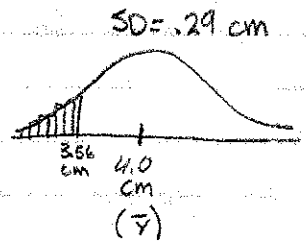
Here is a formula for the bell curve $f(y) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2\sigma^2}(y-\bar{y})^2}$



Not helpful in this class

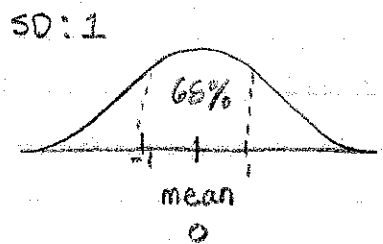
What percentage of the butterflies had wing lengths less than or equal to 3.56 cm?

- a) look at data and count (exact) about $\frac{2}{24} = 8.3\%$
- b) (approximate) approximate areas under normal curves with numerical integration then store the results in a table

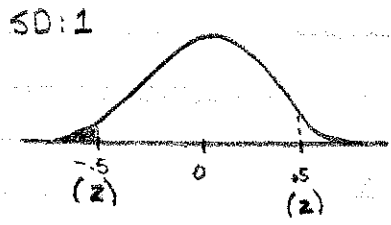


14
14
14
14
14

SD = 0
 $\bar{y} = 14$

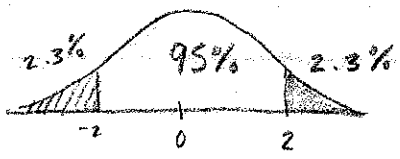


standard normal: all normal curves satisfy curve empirical rule exactly



use negative Z score table = .3085 = 31%

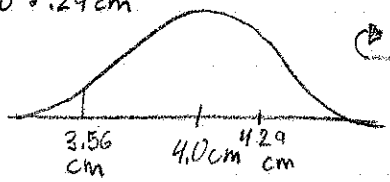
too many significant digits



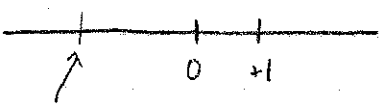
= use negative Z score table with:

- ① Total area under the curve = 1 = 100%
- ② normal curve symmetric

SD = .29 cm



SD = .0643 = 6% moderately close to the correct answer (.8%)



standard units [su] (z) su = how many SD's above or below the mean

$\frac{3.56 \text{ cm} - 4.0 \text{ cm}}{.29 \text{ cm}} = -1.40 \text{ su} = -1.52 = z$

Randomized Controlled Experiments

Experimental Design: cause and effect

Psychological environment

Treatment

↑ X

brain Anatomy

outcome

↑ Y

} Not really ethical to do this on humans, so people did it on animals.

To data gather for this uncertainty we use an experiment not a survey.

Does X affect Y? How to measure X and Y

We are looking at only enriched vs. deprived so it is dichotomous

Same Food + Water { Enriched rats lived 12 rats to cage, new toys everyday, train them
Deprived rats alone, no toys, no training

How we measure X

Measured the cortex of the rat by weighing it } measuring Y