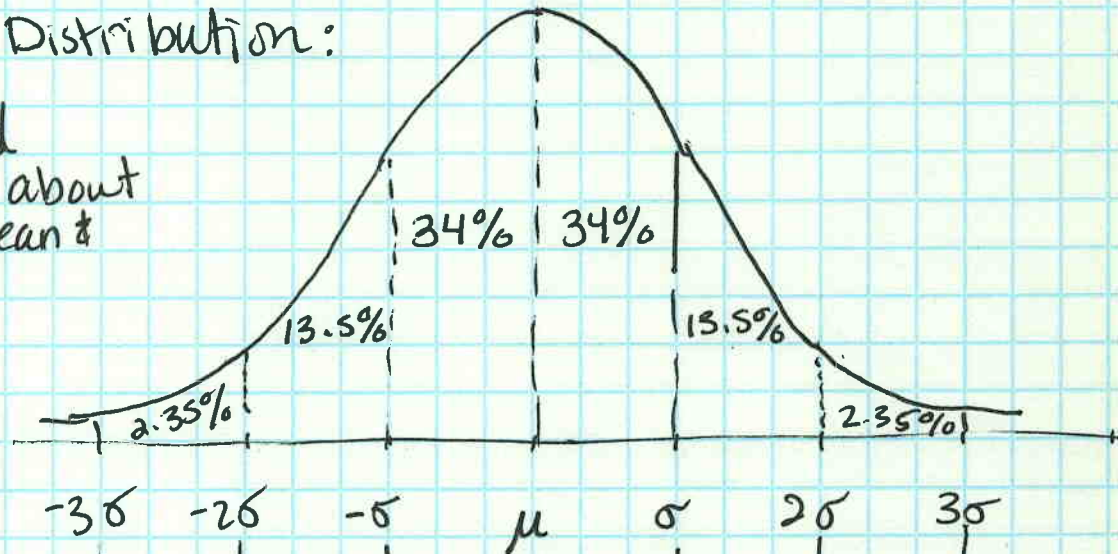


11.3 Normal Curves

Continuous Distribution - Continuous Data

Normal Distribution:

- * Bell Shaped
- * Symmetric about center (mean & median)
- * approaches x-axis
- * area under curve = 1.000 or 100%



Empirical Rule

What % of data comes before a certain standard deviation

good for estimating

Z-values - "z" standard deviations away from the mean, in terms of the number of standard deviations

"standardizing" → from data values to SD values

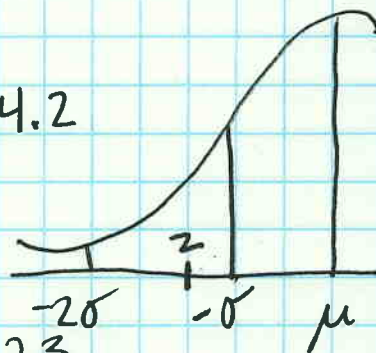
$$z = \frac{X - \mu}{\sigma}$$

+z-value → Right "z" SD's from μ
-z-value → Left "z" SD's from μ

Ex 2 calculate z-values

a) find z when $X=24$, $\mu=29$, $\sigma=4.2$

$$z = \frac{X - \mu}{\sigma} = \frac{24 - 29}{4.2} = -1.19$$



b) find X if $z = -1.73$, $\mu = 48$, $\sigma = 2.3$

"what value is 1.73 left of 48?"

$$z = \frac{X - \mu}{\sigma} \quad -1.73 = \frac{X - 48}{2.3} \quad 3.979 = X - 48$$
$$X = 44.021$$

Use z-value to find the area under the curve

Area under the curve corresponds to the percent of data within the range.

- ① find z -value
- ② use calculator to find Area

normcdf(-99, z)

"normcdf"

normal cumulative distribution function"

area to a certain z -value

Ex call center operator 30 days
 $\mu = 105$ calls/day $\sigma = 12$ calls
How many days were less than 110 calls?

$$z = \frac{X - \mu}{\sigma} = \frac{110 - 105}{12} = \underline{\underline{.42}} \quad .6628 \text{ days } \leq w/ 110 \text{ calls}$$

$.6628 \cdot 30 = 19.88$ approx 20 days had less than 110 calls.

HW 681: 7-8, 11-15, 28, 29, 54-55