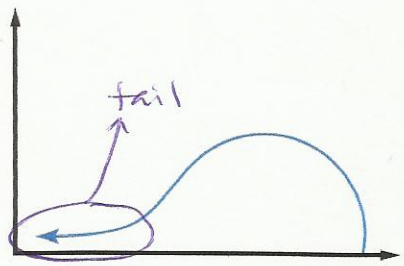
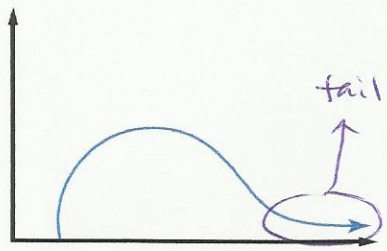
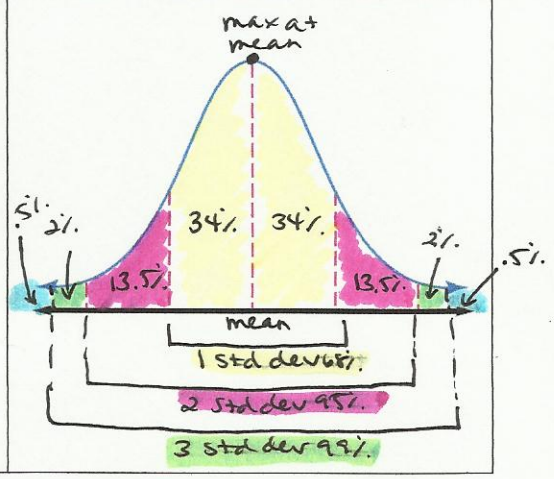
Statistics – The Normal Distribution

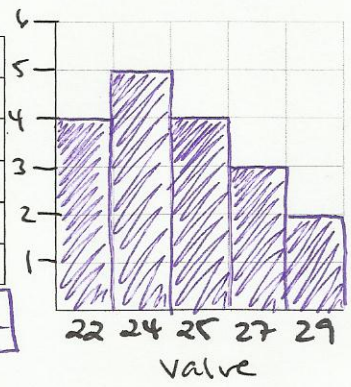
- **continuous probability distribution** → occurs when the outcome can be any value in an interval
  - Never represented by a histogram (bar graph where there are no gaps)
  - Always represented by a (bell) curve, below are some examples of these…

Negatively skewed distribution	Positively skewed distribution	Normal distribution
		
"tail points to left"	"tail points to right"	

Example 1: Using the given table, make a histogram. Determine if the type of distribution. If it's a normal distribution – draw a normal curve with at least standard deviations.

1.)

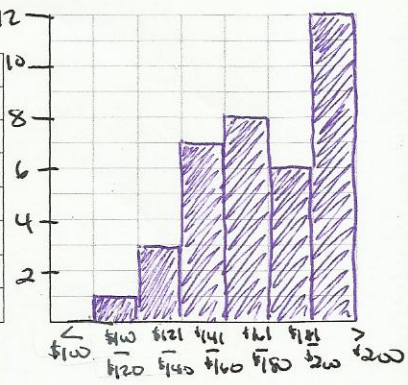
Value	Frequency
22	4
24	5
25	4
27	3
29	2



positively skewed

2.)

Housing Price	No. of Houses Sold
less than $100,000	0
$100,00–$120,000	1
$121,00–$140,000	3
$141,00–$160,000	7
$161,00–$180,000	8
$181,00–$200,000	6
over $200,000	12

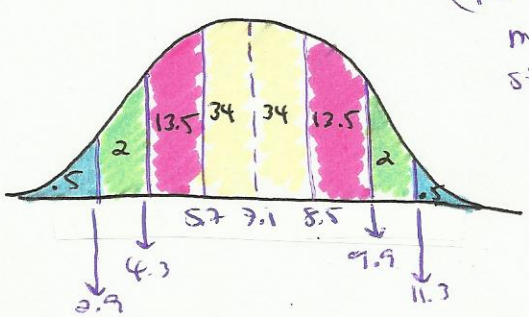


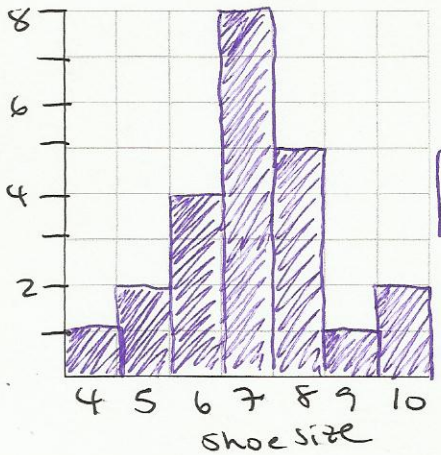
negatively skewed

3.)

Shoe Size	4	5	6	7	8	9	10
No. of Students	1	2	4	8	5	1	2

(put in calc in L1)
mean = 7.1
stddev = 1.4





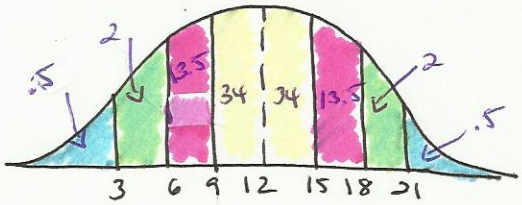
normally distributed

Example 2: **The shelf life of a particular dairy product is normally distributed with a mean of 12 days and a standard deviation of 3 days.**

a.) Draw a normal curve with at least three sets of standard deviations.

mean = 12

std dev = 3



b.) About what percent of the products last between 9 and 15 days? 34% + 34% = 68%

c.) About what percent of the products last between 6 and 21 days? 2(13.5) + 2(34) + 2% = 97%

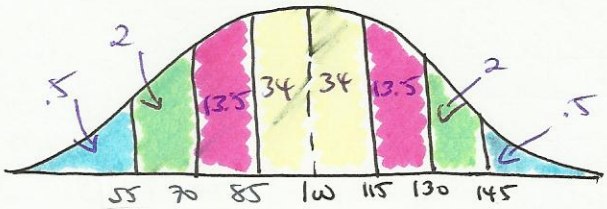
d.) About what percent of the products don't last more than 15 days? .5 + 2 + 13.5 + 2(34) = 84%

Example 3: **The scores on a test administered to prospective employees are normally distributed with a mean of 100 and a standard deviation of 15.**

a.) Draw a normal curve with at least three sets of standard deviation.

mean = 100

std dev = 15



b.) About what percent of the scores are between 70 and 130? 2(13.5) + 2(34) = 95%

c.) About what percent of the scores are between 85 and 130? 2(34) + 13.5 = 81.5%

d.) About what percent of the scores are over 115? 13.5 + 2 + .5 = 16%

e.) About what percent of the scores are lower than 85 (+) or higher than 115? 16 + 16 = 32%

.5 + 2 + 13.5 + 13.5 + 2 + .5

f.) If 80 people take the test, how many would you expect to score higher than 130? .025 × 80 = 2

2 + .5 = 2.5%

g.) If 75 people take the test, how many would you expect to score lower than 85? .16 × 75 = 12

.5 + 2 + 13.5 = 16%

Example 4: **The daily July surface temperature of a lake resort where 500 people are normally distributed has a mean of 82° and a standard deviation of 4.2° If most people prefer to swim when the temperature is at least 77.8°, then how many swimmer have this specified preference?**

mean = 82°

std dev = 4.2°

# of people = 500

2(34) + 13.5 + 2 + .5 = 84%

.84 × 500 = 420 people