TODAY'S ASSIGNMENT:

14.6 #12-20, 22, 27-32

sketch #12, 13, 22, 27, 28

See check answer sheet→ for more details and helpful hints

check ALL answers:
14.6 #12-20, 22, 27-32

#12a ,22
make interval/frequency table, then SKETCH histogram
(use List and Sort to organize values)

#13,27,28 SKETCH normal curve (label axes with $\mu, \pm1\sigma, \pm2\sigma, \pm3\sigma$)

Empirical Rule = sketch and use naturally occurring values 68, 95, 99.7%

Use Calculator = 2nd DISTR option 2
normalcdf (min, max, μ, σ)

Round % to nearest hundredth!

1.39% 2.5% 2.5% 2.5%

4.01% 4.78% 5.99% 19.43%

36.32% 37.81% 63.06%

68% 69.76% 82.02% 95%

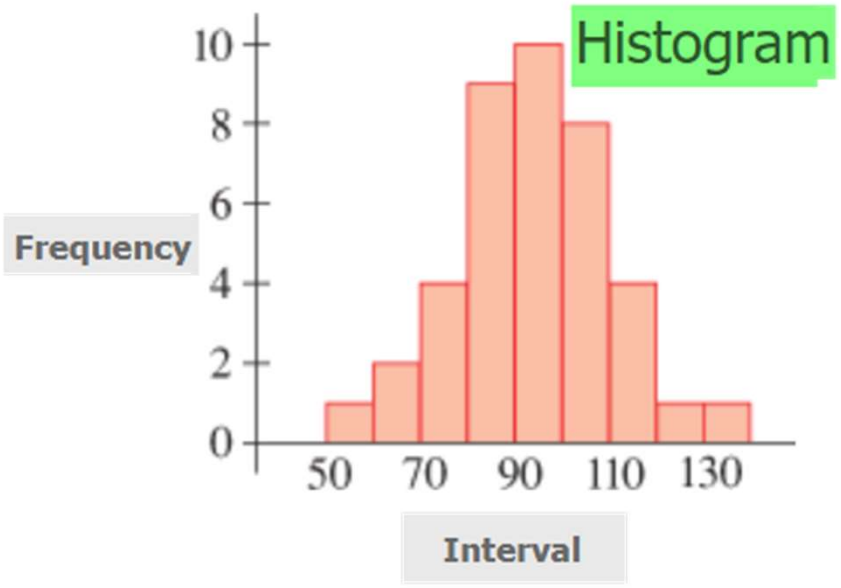
95% 98.17% 238.3 244.5

NOTES 14.6

HISTOGRAM:

A continuous graph that helps visualize how data is distributed in certain categories.

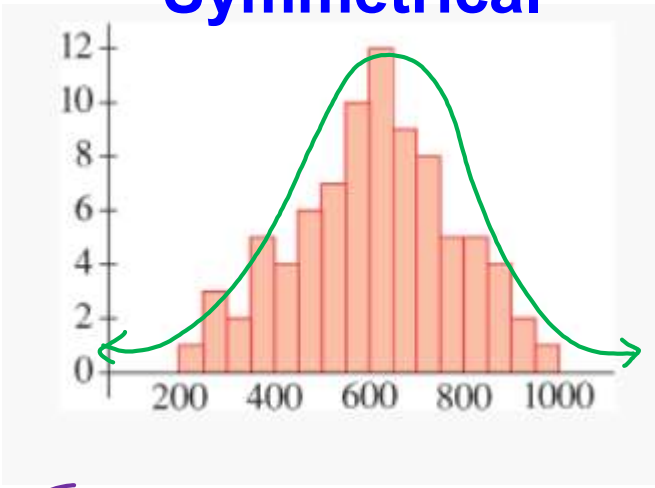
The intervals are called "BINS."



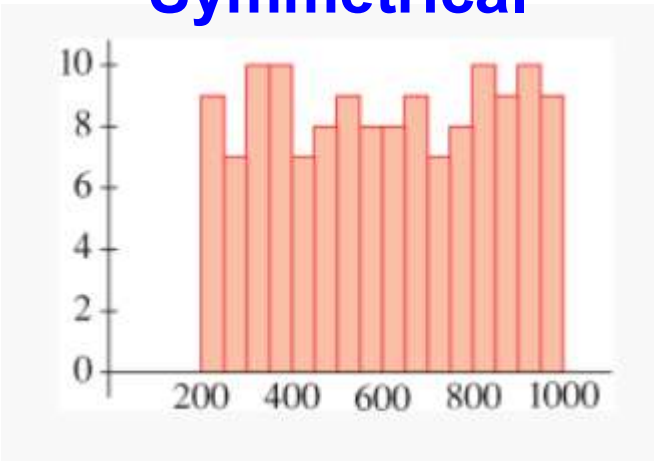
Frequency Distribution

Interval	Frequency
$50 \le x < 60$	1
$60 \le x < 70$	2
$70 \le x < 80$	4
$80 \le x < 90$	9
$90 \le x < 100$	10
$100 \le x < 110$	8
$110 \le x < 120$	4
$120 \le x < 130$	1
$130 \le x < 140$	1

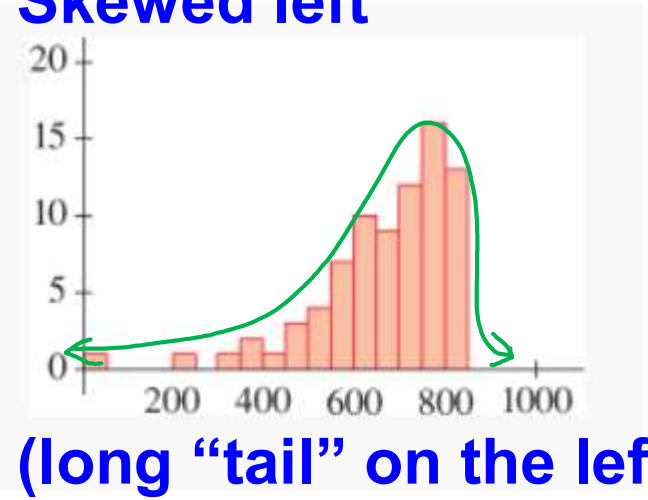
Symmetrical



Symmetrical

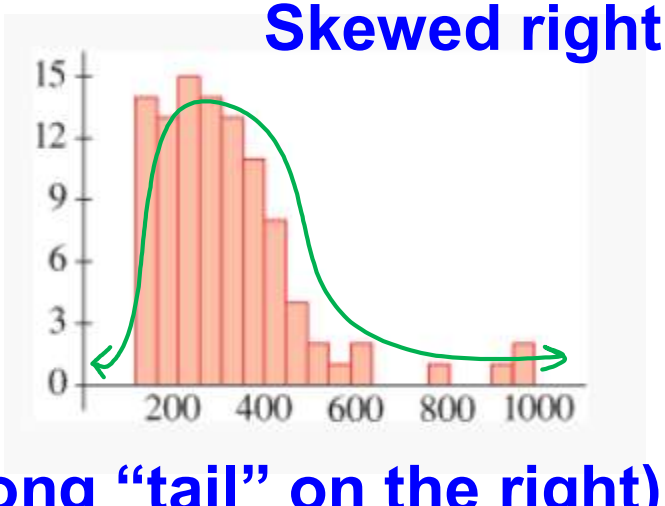


Skewed left



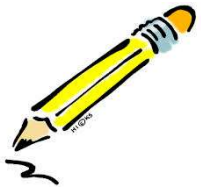
(long "tail" on the left)

Skewed right

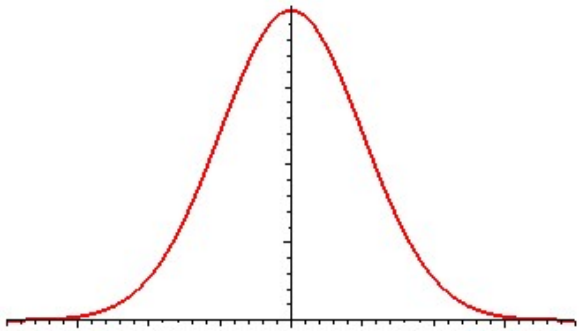


(long "tail" on the right)

NOTES 14.6



The Normal Distribution is a frequency distribution that often occurs when there is a large number of values in a data set.



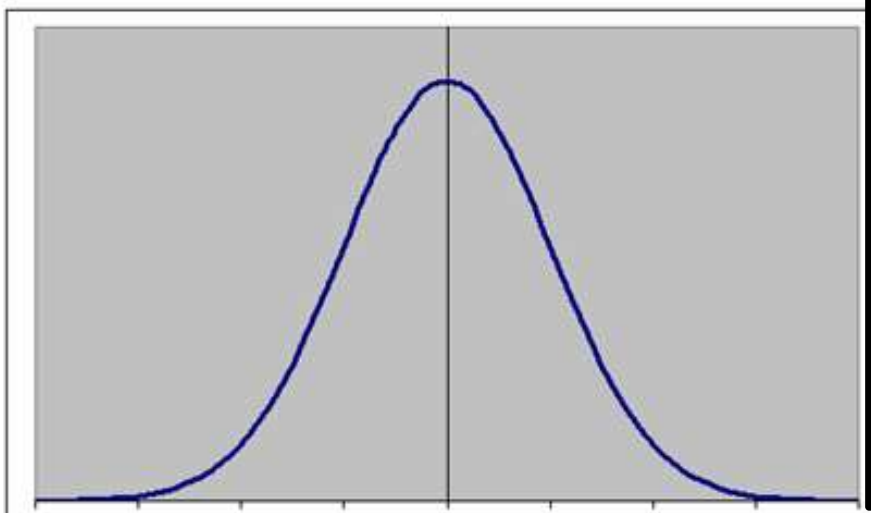
► The graph is symmetrical.

► The graph is a bell-shaped curve.

- Frequencies are concentrated around the center portion of the graph.

- Only a small portion of the population occurs at extreme Values.

- mean=median=mode



The Normal Distribution is called the Empirical Rule (it has naturally occurring values.)

-3σ -2σ -1σ μ $+1\sigma$ $+2\sigma$ $+3\sigma$

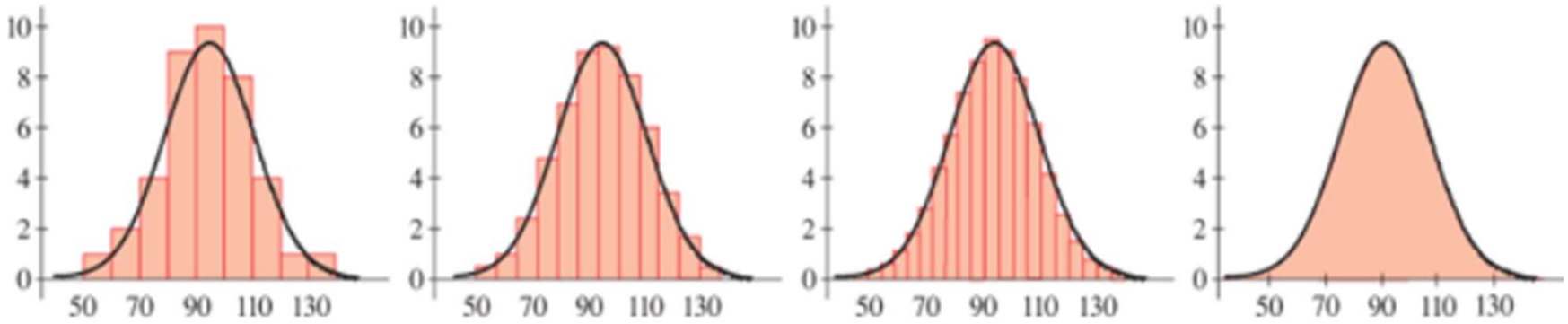
68% of data within **1** stand. dev. of the mean

95% of data within **2** stand. dev. of the mean

99.7% of data within **3** stand. dev. of the mean

σ = standard deviation

Histogram approximates normal curve



Notation used:

σ = *standard deviation.* ***(sigma)***

μ *is the symbol often used for the* ***mean of a normal distribution. (mu)***

$\overline{X}$ = *mean (or arithmetic mean) when analyzing general data.*

Calculator command

we will use:

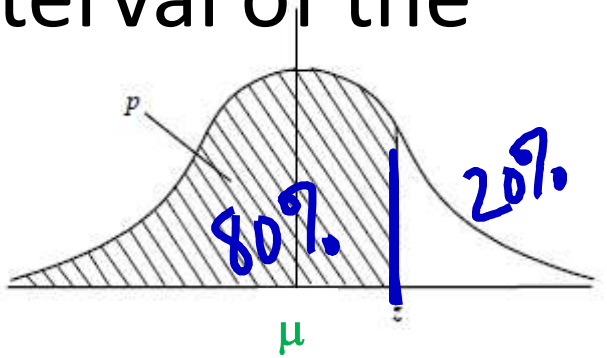
2nd DISTR

Given the boundary lines, find the area (% shaded) under the curve

2:normalcdf(*lower, upper,* μ *,* σ)

Area under the Standard Normal Curve:

The area represents the probability (percent of data) for a given interval of the normal distribution.



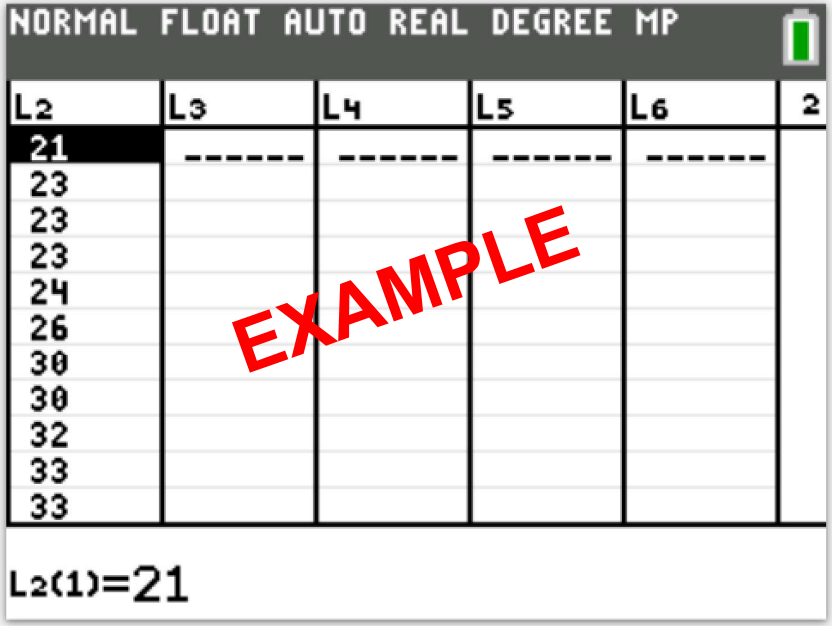
The entire area under the curve represents all possible outcomes so the total is 100%

Calculator commands we will use today:

2nd DISTR

only use cdf

2:normalcdf(*lower, upper*, μ, σ)



Key Press History

Hint: first enter values into a LIST in your calculator, then sort. Use this info to create frequency table and histogram.

9–12 Getting Information from a Histogram A data set is given.

(a) Draw a histogram of the data, using bins (or intervals) of the given size.

(b) Are the data symmetric, skewed, or neither?

(c) Calculate the median and the mean.

← change instructions for #12

#12 Bin length is ~~25~~ 50, starting at ~~50~~ 100

189	346	245	338	298	159	349	127
305	220	229	235	247	162	107	358
182	217	193	244	258	290	202	129
270	184	180	270	284	115	131	320
152	213	112	373	219	257	248	133
348	374	321	296	157	283	310	259

check ALL answers:
14.6 #12-20, 22, 27-32

#12a ,22
make interval/frequency table, then SKETCH histogram
(use List and Sort to organize values)

Enter values into a LIST in your calculator, then sort.

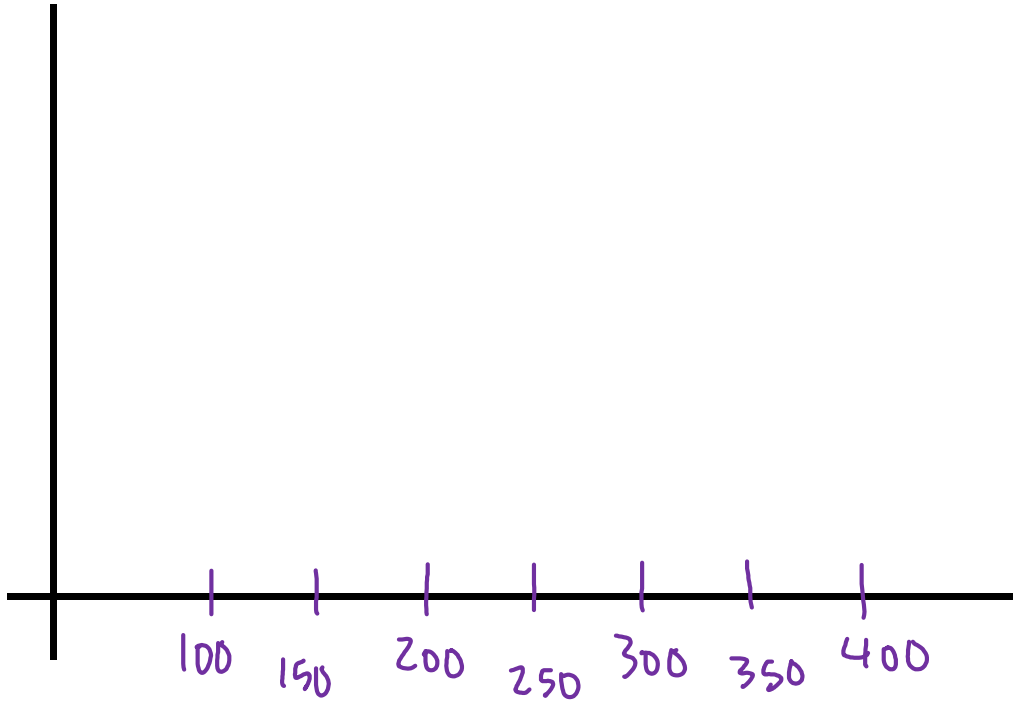
#12a GIVEN: start at 100, bin size = 50

Interval	Frequency
(100 ≤ x < 150) 100-150	7
150-200	
200-250	
250-300	
300-350	
350-400	

check ALL answers:
14.6 #12-20, 22, 27-32

#12a ,22
make interval/frequency table, then SKETCH histogram
(use List and Sort to organize values)

Here are some values to get you started!!

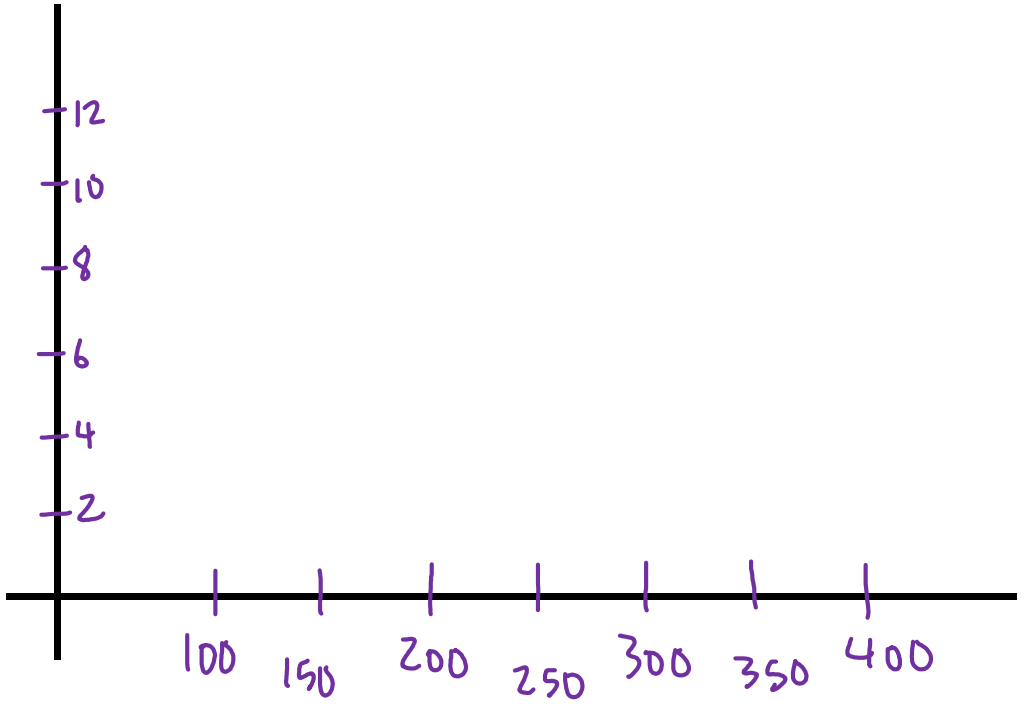


#12a GIVEN: start at 50, bin size = 50

Interval	Frequency
(100 ≤ x < 150) 100-150	7
150-200	9
200-250	11
250-300	10
300-350	8
350-400	3

check ALL answers:
14.6 #12-20, 22, 27-32

#12a ,22
make interval/frequency table, then SKETCH histogram
(use List and Sort to organize values)



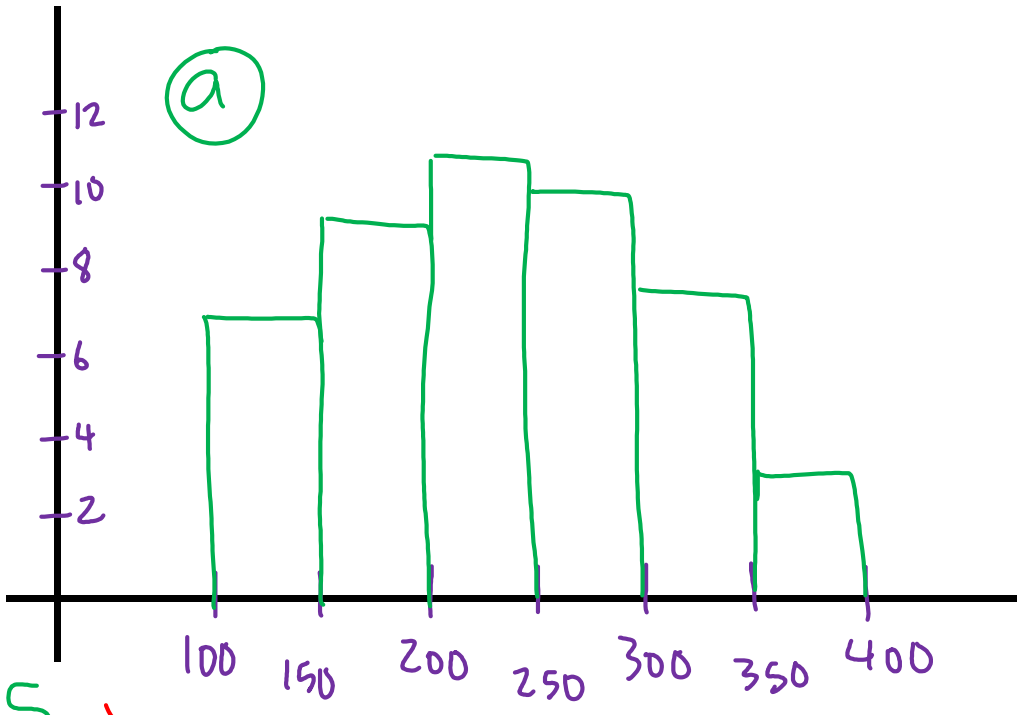
#12a GIVEN: start at 50, bin size = 50

Interval	Frequency
(100 ≤ x < 150) 100-150	7
150-200	9
200-250	11
250-300	10
300-350	8
350-400	3

check ALL answers:
14.6 #12-20, 22, 27-32

#12a ,22
make interval/frequency table, then SKETCH histogram
(use List and Sort to organize values)

a



b. overall Symmetrical

c. median = 244.5
mean ≈ 238.3 > refer to 1-Var Stats for Med and $\bar{x}$

13–16 Using the Normal Distribution (Empirical Rule)

A data set is normally distributed with mean 35 and standard deviation 9.

Use the Empirical Rule to find the proportion of data points that lie in the given interval.

13. Between 26 and 44

14. Between 17 and 53

15. At most 17

16. At least 53

#13,27,28 SKETCH normal curve (label axes with μ, $\pm 1\sigma$, $\pm 2\sigma$, $\pm 3\sigma$)

Empirical Rule = sketch and use naturally occurring values 68, 95, 99.7%

Use Calculator = 2^{nd} DISTR option 2
normalcdf (min, max, μ, σ)

Sketch normal curve, label all values, then solve #13-16!!

13–16 Using the Normal Distribution (Empirical Rule)

A data set is normally distributed with mean 35 and standard deviation 9. = σ

Use the Empirical Rule to find the proportion of data points that lie in the given interval.

sketch curve + use fixed values

13. Between 26 and 44 = 68%

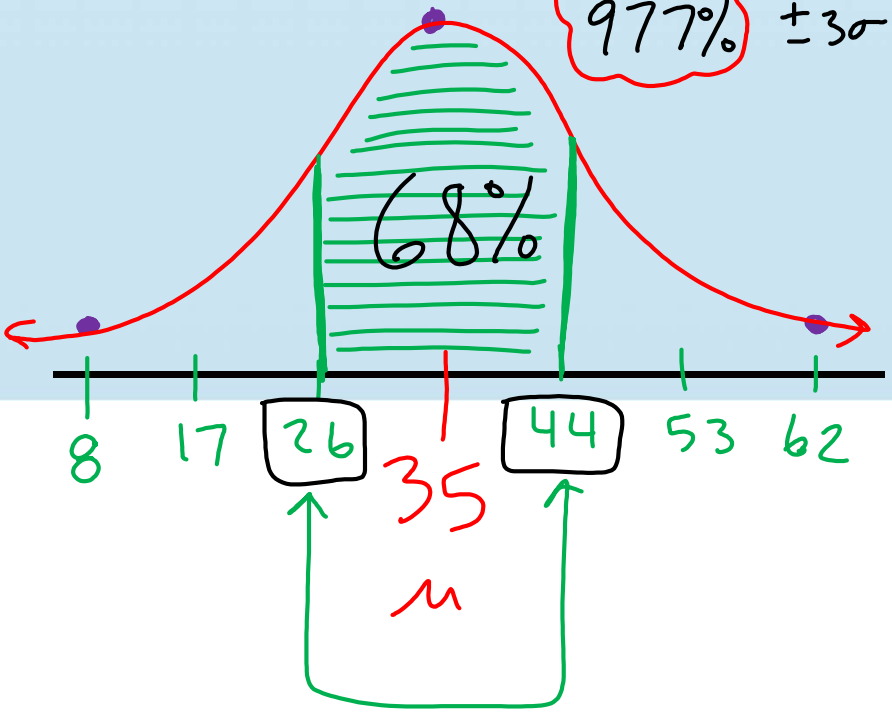
14. Between 17 and 53

15. At most 17

16. At least 53

from notes →

68% ±1σ
95% ±2σ
99.7% ±3σ



35 ± 9(1)

(add & subtract 1 standard deviation)

#13,27,28 SKETCH normal curve (label axes with μ, ±1σ, ±2σ, ±3σ)

Empirical Rule = sketch and use naturally occurring values 68, 95, 99.7%

Use Calculator = 2nd DISTR option 2
normalcdf (min, max, μ, σ)

13–16 Using the Normal Distribution (Empirical Rule)

A data set is normally distributed with mean 35 and standard deviation 9.

Use the Empirical Rule to find the proportion of data points that lie in the given interval.

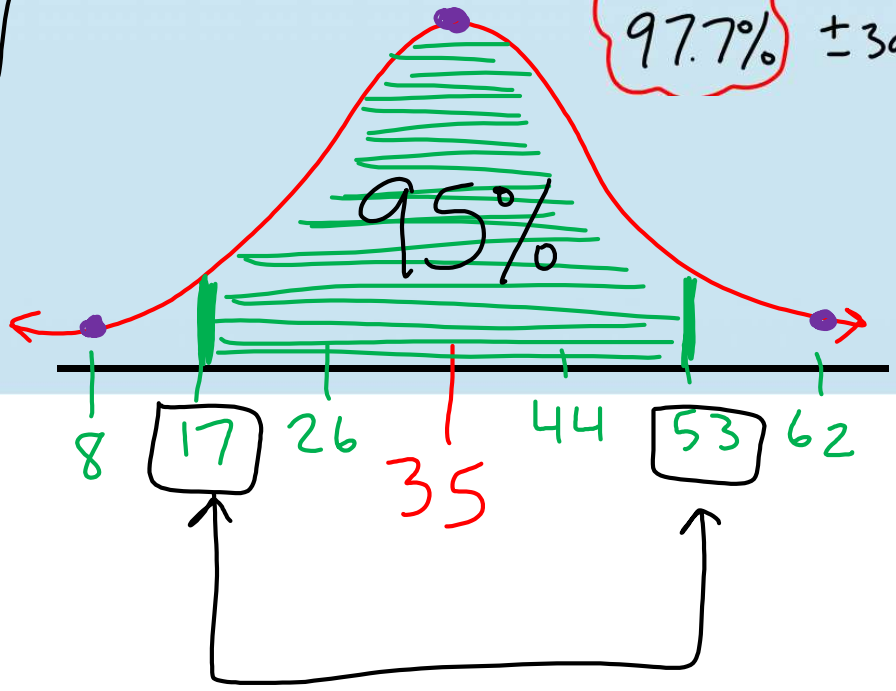
13. Between 26 and 44

14. Between 17 and 53 = 95%

15. At most 17

16. At least 53

68% ±1σ
95% ±2σ
97.7% ±3σ



$35 \pm 9(2)$

add + subtract
2 standard deviations

13–16 Using the Normal Distribution (Empirical Rule)

A data set is normally distributed with mean 35 and standard deviation 9.

Use the Empirical Rule to find the proportion of data points that lie in the given interval.

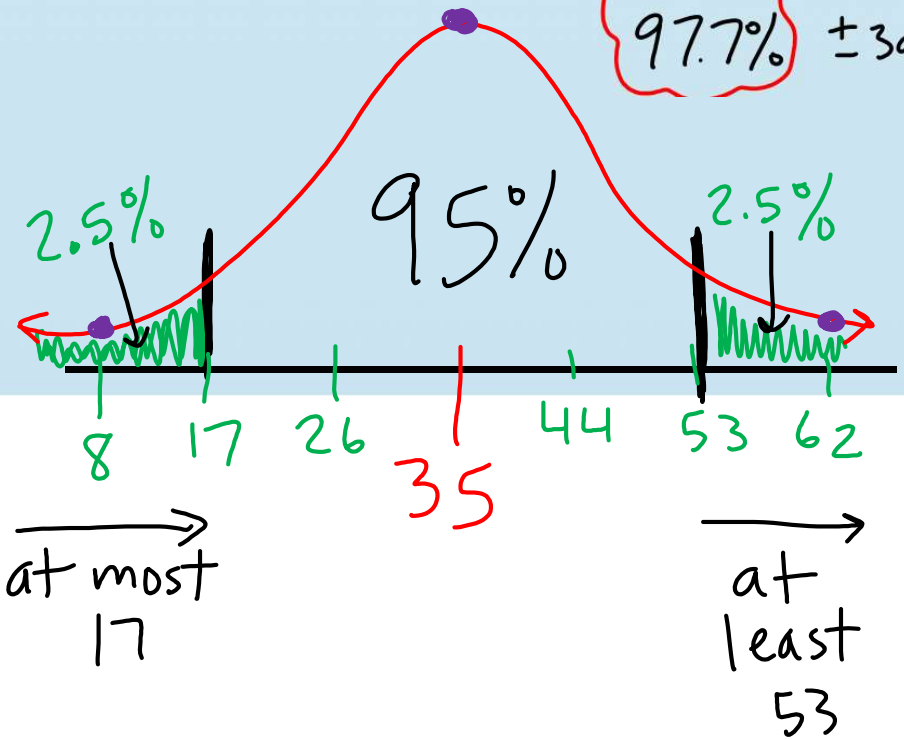
13. Between 26 and 44

14. Between 17 and 53

15. At most 17 — 2.5%

16. At least 53 — 2.5%

68% ±1σ
95% ±2σ
97.7% ±3σ



entire area under curve = 100%

so 100% − 95% = 5% ← ÷2

17–20 Using the Normal Distribution (Calculator)

A data set is normally distributed with mean 35 and standard deviation 9.

Use a graphing calculator to find the proportion of data points that lie in the given interval.

17. Between 29 and 38

18. Between 15 and 40

19. At least 32

20. At most 21

Use Calculator = 2nd DISTR option 2

normalcdf (min, max, μ, σ)

See hints on the following slides →

17–20 Using the Normal Distribution (Calculator)

A data set is normally distributed with mean 35 and standard deviation 9.

Use a graphing calculator to find the proportion of data points that lie in the given interval.

17. Between 29 and 38

normalcdf (29, 38, 35, 9) ≈ .3781

(min = 29, max = 38, μ = 35, σ = 9)

= 37.81%

18. Between 15 and 40

normalcdf (15, 40, 35, 9) ≈ .6976

= 69.76%

19. At least 32

20. At most 21

always use cdf

Use Calculator = 2nd DISTR option 2

normalcdf (min, max, μ, σ)

σ = standard deviation

μ = mean

17–20 Using the Normal Distribution (Calculator)

A data set is normally distributed with mean 35 and standard deviation 9.

Use a graphing calculator to find the proportion of data points that lie in the given interval.

17. Between 29 and 38

18. Between 15 and 40

19. At least 32 → normalcdf(32, 1000, 35, 9) ≈ .6306 ≈ 6306%

20. At most 21

μ

σ

choose a large number beyond your data set

32 and above

minimum value

min

max

Use Calculator = 2nd DISTR option 2

normalcdf (min, max, μ, σ)

standard deviation

mean

17–20 Using the Normal Distribution (Calculator)

A data set is normally distributed with mean 35 and standard deviation 9.

Use a graphing calculator to find the proportion of data points that lie in the given interval.

17. Between 29 and 38

18. Between 15 and 40

19. At least 32

20. At most 21

μ

σ

pick a smaller value that is beyond your data set

max = normalcdf(−1000, 21, 35, 9) ≈ .0599

min: −1000 max: 21

or 5.99%

21 and below

Use Calculator = 2nd DISTR option 2

normalcdf (min, max, μ, σ)

σ: standard deviation

μ: mean