4.939 – 5.0492

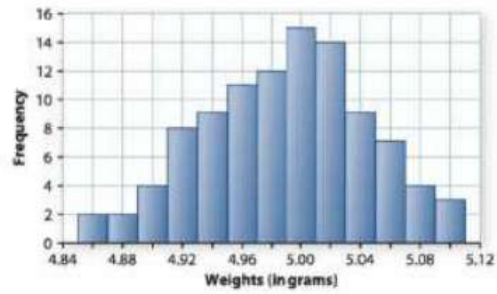
4.8839 — 5.1013

4.8288 - 5.1594

2. The data and the accompanying histogram give the weight, to the nearest hundredth of a gram, of a sample of 100 new nickels.

Nickel Weights (in grams)

4.87	4.92	4.95	4.97	4.98	5.00	5.01	5.03	5.04	5.07
4.87	4.92	4.95	4.97	4.98	5.00	5.01	5.03	5.04	5.07
4.88	4.93	4.95	4.97	4.99	5.00	5.01	5.03	5.04	5.07
4.89	4.93	4.95	4.97	4.99	5.00	5.02	5.03	5.05	5.08
4.90	4.93	4.95	4.97	4.99	5.00	5.02	5.03	5.05	5.08
4.90	4.93	4.96	4.97	4.99	5.01	5.02	5.03	5.05	5.09
4.91	4.94	4.96	4.98	4.99	5.01	5.02	5.03	5.06	5.09
4.91	4.94	4.96	4.98	4.99	5.01	5.02	5.04	5.06	5.10
4.92	4.94	4.96	4.98	5.00	5.01	5.02	5.04	5.06	5.11
4.92	4.94	4.96	4.98	5.00	5.01	5.02	5.04	5.06	5.11



a. The mean weight of this sample is 4.9941 grams. Find the median weight from the table above. How does it compare to the mean weight?

b. Which of the following is the standard deviation?
.0253 grams .0551 grams .253 grams 1 gram

c. Mark points along the horizontal axis that correspond to the mean and one standard deviation above the mean, one standard devotion below the mean, two standard devotions above the mean, two standard deviations below the mean, three standard deviations above the mean, and three standard deviations below the mean.

d. What percentage of the weights in the table above are within one standard deviation of the mean? Within two standard deviations? Within three standard deviations?

1-SD = 67/100 - 67%

2-SD = 95/100 = 95%

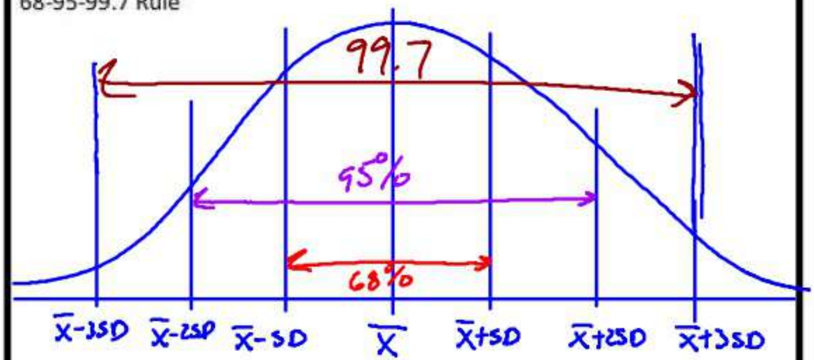
3-SD = 100/100 = 100%

e. Suppose you weigh a randomly chosen nickel from this collection. Find the probability that its weight would be within two standard deviations of the mean.

95%

.95

68-95-99.7 Rule



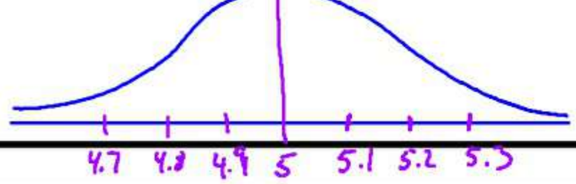
μ - Mu
Sample Mean

σ - Sigma
Sample Standard Deviation

3. Suppose that the distribution of the weights of newly minted coins is a normal distribution with a μ of 5 grams and standard deviation σ of 0.10 grams.

(5, .10) (μ, σ)

a. Draw a sketch of this distribution. Then label the point on the horizontal axis that corresponds to the mean, one standard deviation above and below the mean, two standard deviations above and below the mean, and three standard deviations above and below the mean.



b. Between what two values do the middle 68% of the weights of coins lie? The middle 95% of the weights? The middle 99.7% of the weights?

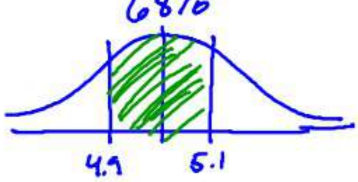
68% – 4.9 - 5.1

95% – 4.8 - 5.2

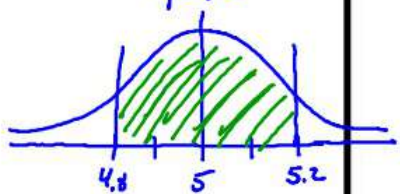
99.7% 4.7 - 5.3

c. Illustrate your answers in Part b by shading appropriate regions in copies of your sketch.

68%



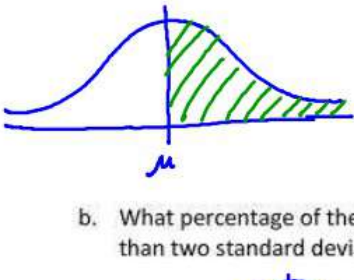
95%



4. Answers the following questions about normal distributions. Draw sketches illustrating your answers.

a. What percentage of the value in a normal distribution line above the mean?

50%

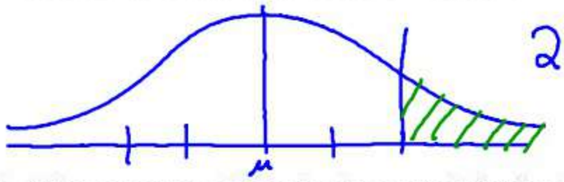


b. What percentage of the values in a normal distribution lie more than two standard deviations from the mean?

5%

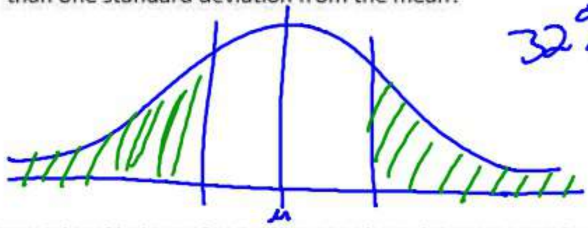
c. What percentage of the values in a normal distribution lie more than two standard deviations above the mean?

2.5%



d. What percentage of the values in a normal distribution lie more than one standard deviation from the mean?

32%



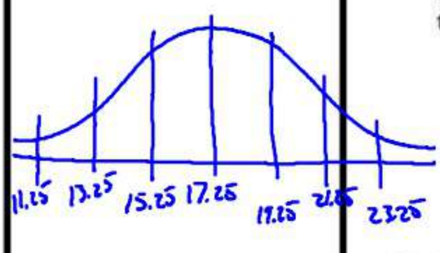
5. The weight of babies of a given age and gender are approximately normally distributed. This fact allows a doctor or nurse to use a baby's weight to find the weight percentile to which the child belongs. The table below gives information about the weights of six-month-old and twelve-month-old baby boys.

Weights of Baby Boys

	Weight at Six Months (in pounds)	Weight at Twelve Months (in pounds)
Mean μ	17.25	22.50
Standard Deviation σ	2.0	2.2

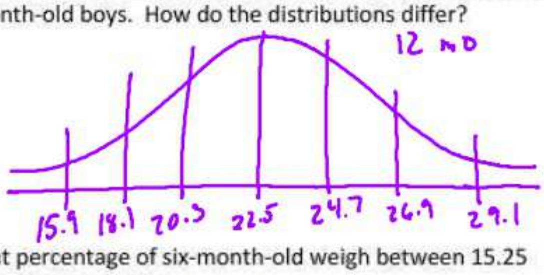
Source: Tannenbaum, Peter, and Robert Arnold. *Excursions in Modern Mathematics.* Englewood Cliffs, New Jersey: Prentice Hall. 1992.

6 mo



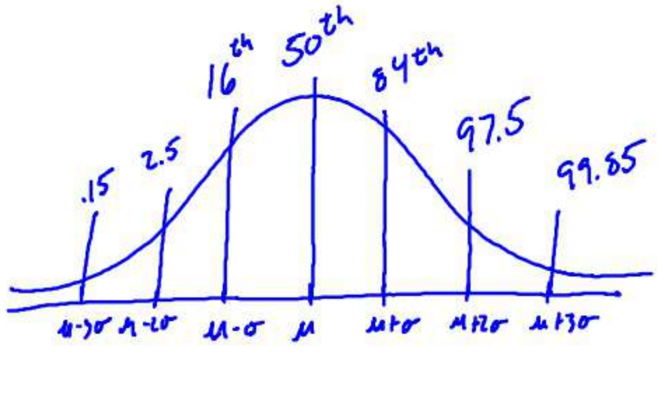
a. On a separate axis, draw sketches that represent the distribution of weights for six-month-old boys and the distribution of weighs for twelve-month-old boys. How do the distributions differ?

12 mo



b. About what percentage of six-month-old weigh between 15.25 pounds and 19.25 pounds?

68%

	c. About what percentage of twelve-month-old boys weigh more than 26.9 pounds? 2.5 %
Percentile	d. A twelve-month-old boys weighs 24.7 pounds is at what percentile for weight? 84th
	e. A six-month-old boy who weighs 21.25 pounds is at what percentile? 97.5
	Percentile 

What you will learn about:
Standardized Values

1. Examine the table below, which gives information about the heights of young Americans aged 18 to 24. Each distribution is approximately normal.

Heights of American Young Adults (in inches)

	Men	Women
Mean μ	68.5	65.5
Standard Deviation σ	2.7	2.5

a. Sketch the two distributions. Include a scale on the horizontal axis.

b. Alex is 3 standard deviations above average in height. How tall is she?

$65.5 + 3(2.5) = 73''$

c. Marvin is 2.1 standard deviations below average in height. How tall is he?

$68.5 - 2.1(2.7) = 62.83''$

d. Miguel is 74" tall. How many standard deviations above average height is he?

$68.5 + x(2.7) = 74$

$x = 2.04$

	e. Jackie is 62" tall. How many standard deviations below average height is she? $65.5 + x(2.5) = 62$ $x = -1.4$
	f. Marina is 68" tall. Steve is 71" tall. Who is relatively taller for her or his gender, Marina or Steve. Explain your reasoning. Steve .93 Marina 1
Standardized Value	2. Look more generally how standardized values are computed. a. Refer to Problem 1, Parts d and e. Compute the standardized values for Miguel's height and Jackie's height. b. Write a formula for computing the standardized value ***z*** of a value ***x*** if you know the mean of the population μ and the standard deviation of the population σ.
	3. Now consider how standardizing values can help you make comparisons. Refer to the table in Problem 1. a. Find the standardized value for the height of a young woman who is 5 feet tall. b. Find the standardized value for the height of a young man who is 5 feet 2 inches tall.