

Welcome to Statistics!

In the following pages, you will find review materials that will prepare you for Statistics. All of these topics should be review or relatively straight-forward to learn with the given resources. Please take the exercises seriously, as this will allow us to hit the ground running in the fall.

Please remember than Khan Academy is a useful resource. I encourage you to work with your classmates. You're also welcome to email me (beth.hill@icregina.com).

Materials Needed for Statistics:

- Graphing calculator (Texas Instruments) - TI-84 Plus CE or TI-Nspire CX (not CAS). I am more familiar with the TI-84 Plus CE. We will use calculators a lot in Statistics, and a scientific calculator doesn't have the correct capabilities.
- 3-ring binder (1 or 1.5 inches) to keep notes and handouts organized
- Loose-leaf paper
- Folder with 2 pockets (if your 3-ring binder doesn't have pockets)
- Pencils (you must have a pencil for class every day)

The review materials are separated into weeks. These weeks are only a suggestion. You will have the most benefit from this material if you work on it throughout the summer and do a final review of your work a week or two before school starts. You are welcome to work with your classmates but make sure that you are doing your own work.

You may use a calculator on Weeks 1-4 and 7.

This packet must be completed by the first day of class. We will have a quiz or test over the material at the beginning of the semester that will count toward your grade.

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I look forward to seeing everyone on the first day of school!

Mrs. Hill

Most material from:

[http://ufrsdhs.sharpschool.net/UserFiles/Servers/Server_1171687/File/Summer%20EOC%20As signments/stats.pdf](http://ufrsdhs.sharpschool.net/UserFiles/Servers/Server_1171687/File/Summer%20EOC%20As%20signments/stats.pdf)

[https://resources.finalseite.net/images/v1589291608/stmarybayview/zjw3wivukdaarnifxo8h/M ath-Statistics-AllLevels.pdf](https://resources.finalseite.net/images/v1589291608/stmarybayview/zjw3wivukdaarnifxo8h/Math-Statistics-AllLevels.pdf)

Week 1: Probability

Resources:

Search for probability and independent events or dependent events.

1. You are a contestant on the Wheel of Fun. The spinner contains 4 red panels, 5 yellow panels, 7 blue panels, 1 Bankrupt panels, and 2 Free Spin panels. Utilize this given information to calculate the following probabilities.
 - a. Landing on a red panel
 - b. Landing on anything except a blue panel
 - c. Landing on a yellow or a red panel
 - d. Landing on any non-color panel
2. A scientist is tagging fish in the Allentown Lake. She catches a fish, tags it, and releases it back into the water. The scientist knows the exact number of fish in the lake: 32 bass, 3 bull sharks, 10 carp, and 14 fluke. What is the probability that the scientist will catch:
 - a. a bass and then a carp?
 - b. two consecutive bull sharks?
 - c. a fluke and then any different type of fish?
 - d. a bass, another bass, and then a bull shark?
3. There is a boardwalk game at Point Pleasant where you are blindfolded to throw darts at a board full of balloons. Each time a balloon is popped, it is not replaced until the next turn.

The board has 10 green, 4 purple, 5 red, 2 tie-dye, and 3 black balloons. Find the probabilities of the following outcomes:

- a. Popping 2 red balloons on your first 2 throws in one turn

 - b. Popping a red balloon and then a green balloon on your first 2 throws in one turn

 - c. Popping a red balloon, then a black balloon, and then a red balloon on your first 3 throws in one turn

 - d. Popping anything except a tie-dyed balloon on 3 consecutive throws in one turn
4. A spinner is labeled with the numbers 1 through 9. What is the probability that you will:
- a. land on a 3?

 - b. NOT land on a 9?

 - c. land on an even number?

 - d. land on a number less than 6?

 - e. land on a number greater than 12?

 - f. land on a number less than 10?

Week 2: Discrete Math

Fundamental Counting Principle

Resource:

Search for fundamental counting principle

1. A restaurant is having a new create your own meal special that includes a choice of appetizer, entrée, and dessert for \$19.99. The choices for each category are shown below.

<u>Appetizer</u>	<u>Entrée</u>	<u>Dessert</u>
Mozzarella sticks	Steak	Brownie sundae
Buffalo wings	Salmon	Apple pie
Potato skins		Cheesecake
		Cinnamon oblivion

Use the fundamental counting principal to calculate the total possible meal combinations for this special.

2. If the restaurant from #1 wanted to increase the total available choices to 36, what can they do to their menu to reflect this change? Explain your answer.
3. A 5-digit security code consists of digits 0 through 9 for each digit. Assuming you can repeat digits, how many total alarm code combinations exist?
4. An Iowa license plate consists of 3 numbers (0 through 9) followed by 3 letters. How many license plate combinations are possible if numbers and letters can be reused?
5. A 3-digit locker combination works best when each number (0-39) is not repeated. How many possible combinations are possible without replacement (no number can be reused)?
6. How many different ways can 6 books be placed on a shelf?

Permutations

Resource: Search for permutations

7. Evaluate the following:
- a. $9!$
 - b. $P(9, 4)$
 - c. $P(7, 5) + P(12, 6)$
8. There are 15 contestants at a figure-skating competition. How many ways can the gold, silver, and bronze medals be awarded?
9. The Biker's National Club has 25 members running for the officers (President, Vice President, Secretary, and Treasurer). How many ways can a set of officers be formed?
10. How many different ways can you arrange the letters in the word:
- a. STATISTICS?
 - b. ASSIGNMENT?

Combinations

Resource: Search for permutations

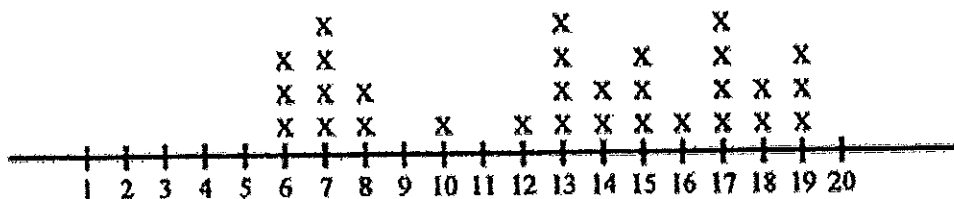
11. Evaluate the following:
- b. $C(7, 4)$
 - b. $C(15, 3)$
 - c. $C(4, 2) + C(9, 4)$
12. A history report requires you to write about three of the original 13 colonies. How many different ways can you choose to complete this task?
13. The manager of an accounting firm wants to form a 3-person advisory committee from 16 employees in the firm. In how many ways can the manager form this committee?
14. The Mock Trial team requires a 12-person trial team. A total of 10 lawyers and 6 prosecutors applied for the team. How many different possible teams can be assembled if each team must consist of 7 lawyers and 5 prosecutors?

Week 3: Measures of Central Tendency

Resources:

Search for mean, median, mode, range of a data set, line plots, stem-and-leaf plots, box-and-whisker plot, and histograms

1. The following line plot shows the number of movies seen per year by a group of Regina students.

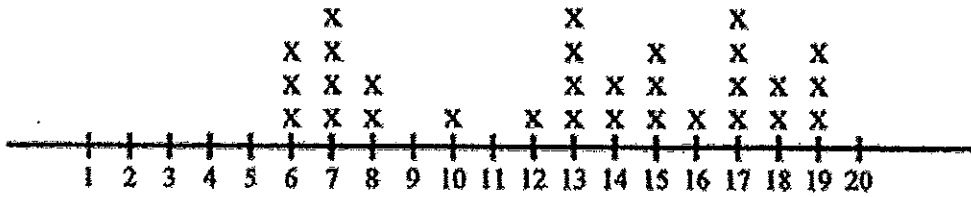


How many students have seen between 6 and 18 movies, inclusively?

2. Create a stem-and-leaf plot for the following data set:

21, 33, 31, 35, 17, 27, 19, 20, 27, 27, 17, 29, 32, 34, 24

3. Create a box-and-whisker plot from the line plot below.



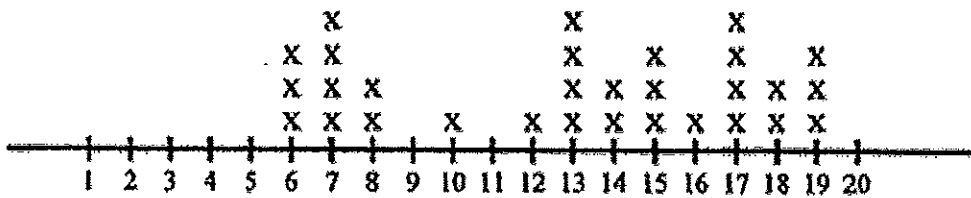
4. Consider the following data set:

42, 24, 21, 22, 33, 35, 17, 31, 17, 19, 27, 20, 47, 17, 39

For the data set, find the:

- a. Mean b. Median c. Mode d. Range

5. Calculate the mean, median, mode, and range of the data represented by the following line plot:



- a. Mean b. Median c. Mode d. Range

6. Calculate the mean, median, mode, and range of the data represented by the following stem-and-leaf plot:

RBI's for American League Leaders

Stem	Leaf	Key
7	8	15 5 = 155
8		
9		
10	5 8 9 9 9	
11	6 4 2 2 8 8 9 3 7 8 9 9 2	
12	9 6 2 6 2 1 6 2 6 3 1 4 4 9 6	
13	0 9 9 3 4 2 3	
14	4 5 2 0 5 8 7	
15	5 9	

- a. Mean b. Median c. Mode d. Range

7. Create a histogram for the following data with the number of dogs adopted on the horizontal axis and the number of months on the vertical axis.

Number of Dogs Adopted from the Animal Shelter by Month

Month	Number of dogs
January	8
February	15
March	18
April	11
May	9
June	20

Month	Number of dogs
July	12
August	9
September	7
October	11
November	9
December	24

Week 4: Percents

Resources:

Search for proportions, sale price, compound interest, commission, sales tax, and percent change

1. Convert between percents and decimals in the table.

Percent		95%		2.021%		0.017%
Decimal	0.125		0.003		4.09	

2. On a recent test, 14 out of 56 students got an A. What percent of students got an A?
3. A survey found that 25% of the 312 students at Allentown High School bring their lunch from home. How many students bring their lunch from home?
4. 32 is 25% of what number?
5. The cafeteria has 246 oranges. At the end of lunch, they have 23 oranges left. What percentage of the 246 oranges are left at the end of lunch?

6. In a boutique, a \$14 scarf is on sale for 20% off. What is the sale price of the scarf?

7. In a bicycle store, a \$500 bicycle is marked with a sign that says, "Get a 30% discount plus an additional 10% off if you use your credit card." What is the final sale price of the bicycle?

8. Samantha deposited \$400 into a savings account that earned 4.5% interest per year. How much money did she have after 2.5 years if the interest is compounded annually?

9. Ed borrowed \$3,600 to finance a large-screen television at a rate of 6.25% for 4.75 years. How much interest will he pay if the interest is compounded annually?

10. A department store pays an interior designer a 25% commission for sales per month. How much will the department store have to pay the interior designer if her weekly sales are \$1,875 for 4 consecutive months?

11. If the sales tax rate is 7.25% in California, then how much tax should a merchant in California charge for the sale of a \$15 tote bag?

12. Amy bought a dress marked \$42 and then paid the store clerk a total of \$43.47. What was the sales tax rate?

13. If the sales tax rate is 7.5% in New York State, then how much was the original price for a pair of pants that cost \$36.55 after sales tax was included?

14. At Furnace Woods School, enrollment increased from 320 students in 2018 to 349 students in 2019. What is the percent change in enrollment?

15. Stock for Company XYZ decreased from \$14 per share to \$9 per share. What is the percent change in stock price?

16. The yearly tuition at a college increased from \$50,000 in 2018 to \$59,000 in 2019. What is the percent change in tuition?

17. The price of oil decreased from \$54 per barrel to \$50 per barrel. What is the percent change in oil prices?

Week 5: Solving Equations and Inequalities (No Calculator)

Resources:

Search for solving linear equations, solving linear inequalities, solving multistep equations, solving multistep inequalities

For #1-9, solve the equation. Show your work. No calculators.

1. $x + 7 = 5$

2. $x - 9 = 4$

3. $4x = 20$

4. $\frac{1}{4}x = 5$

5. $\frac{2}{3}x = -7$

6. $2x - 3 = 9$

7. $\frac{1}{2}x + 8 = 7$

8. $\frac{3}{4}(x - 1) = 9$

9. $5(x + 4) = 15$

For #10-15, solve the inequality. Show your work. No calculators.

10. $x - 11 \leq 25$

11. $x + 8 > -5$

12. $3x < -24$

13. $\frac{1}{3}x > 6$

14. $-4x \geq 9$

15. $-2x - 7 < 11$

For #16-18, solve the equation or inequality. Show your work. No calculators. I recommend using cross-multiplication on #16 (rewrite 4 as 4/1 first) and #18.

16. $\frac{1}{n} = 4$

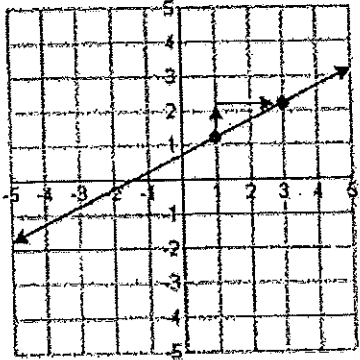
17. $\sqrt{n} = 6$

18. $\frac{2}{\sqrt{n}} = \frac{1}{5}$

Week 6: Equations of Lines

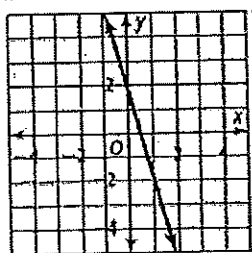
Finding Slope (m)

$$m = \frac{\Delta y}{\Delta x} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

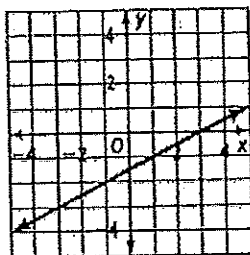
Finding Slope From A Graph	Finding Slope From 2 Points
<div style="text-align: center;">  </div> <p style="margin-left: 20px;"> $\Delta y = 1$ (rise) $\Delta x = 2$ (run) $m = \frac{1}{2}$ </p>	<p>Example: Find the slope of the line between $(-2, 7)$ and $(3, -1)$.</p> $m = \frac{-1 - 7}{3 - (-2)} = \frac{-8}{5}$ $m = -\frac{8}{5}$

For #1-8, find the slope of the following lines (pick 2 points on each line) or points.

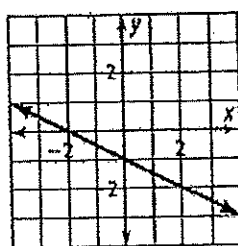
1.



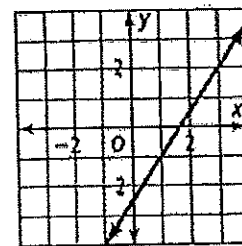
2.



3.



4.



5. $(8, 10)$ and $(-7, 12)$

6. $(-18, -2)$ and $(8, -2)$

7. $(5, -2)$ and $(1, 6)$

8. $(3, 7)$ and $(3, -5)$

Slope-Intercept Form

$$y = mx + b$$

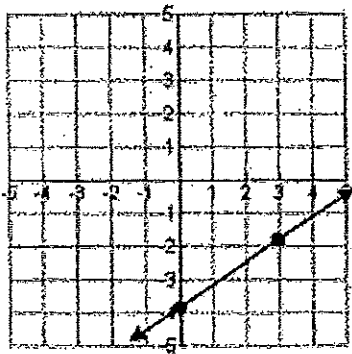
m is the slope of the line
 b is the y -intercept of the line

Example:

Graph $y = \frac{2}{3}x - 4$

y -intercept is -4 or $(0, -4)$

Slope is $\frac{2}{3} \rightarrow$ up 2, right 3

**Point-Slope Form**

$$y - y_1 = m(x - x_1)$$

m is the slope of the line
 (x_1, y_1) is a point on the line

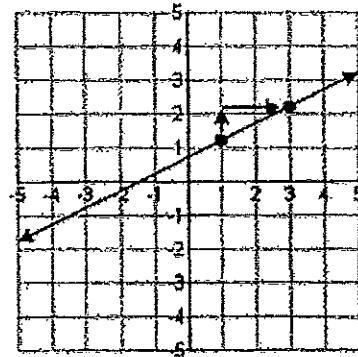
Graph the point and then use the slope to graph more points (using rise over run).

Example:

Graph $y - 1 = \frac{1}{2}(x - 1)$

Point: $(1, 1)$

Slope: $\frac{1}{2} \rightarrow$ up 1, right 2

**Identifying the x - and y -intercepts**

The x -intercept is the point where the graph crosses the x -axis (where $y = 0$). Substitute $y = 0$ to find the x -value of this point.

The y -intercept is the point where the graph crosses the y -axis (where $x = 0$). Substitute $x = 0$ to find the y -value of this point.

Example:

Find the x - and y -intercepts for $-3 = 3(x + 1)$.

 x -intercept

Substitute in $y = 0$: $0 - 3 = 3(x + 1)$

Solve: $-3 = 3(x + 1)$

Distribute 3 through to $x + 1$: $-3 = 3x + 3$

Subtract 3 from both sides: $-6 = 3x$

Divide both sides by 3: $x = -2$

x -intercept: $(-2, 0)$

 y -intercept

Substitute in $x = 0$: $y - 3 = 3(0 + 1)$

Solve: $y - 3 = 3(1)$

Simplify on the right-hand side: $y - 3 = 3$

Add 3 to both sides: $y = 6$

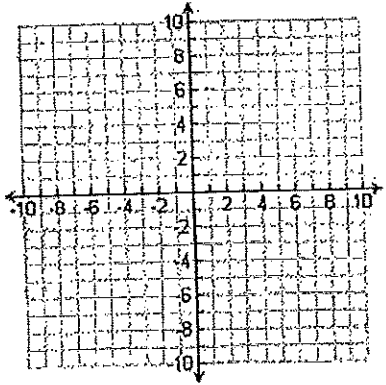
y -intercept: $(0, 6)$

For #9-14, find the requested information and graph the equation.

9. $y = -2x - 1$

Slope: _____

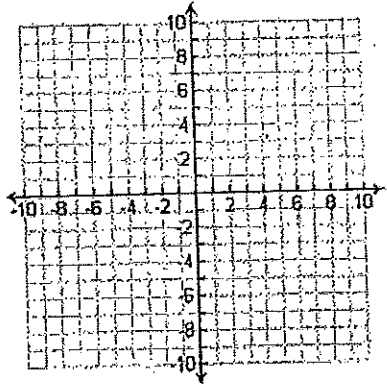
y-intercept: (_____, _____)



10. $y = 3x - 2$

Slope: _____

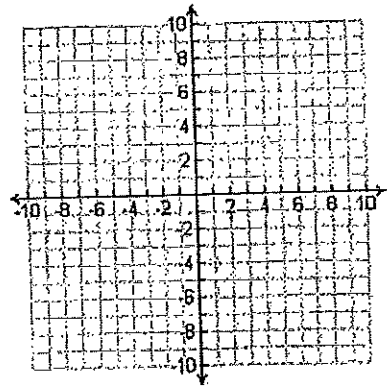
y-intercept: (_____, _____)



11. $y = -\frac{2}{3}x + 4$

Slope: _____

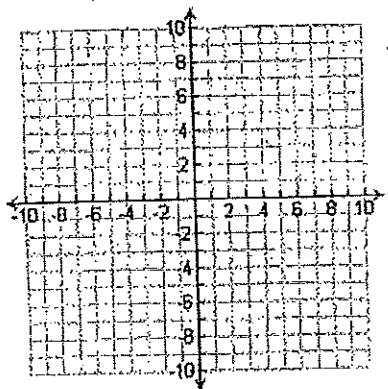
y-intercept: (_____, _____)



12. $y - 1 = \frac{2}{3}(x + 4)$

Slope: _____

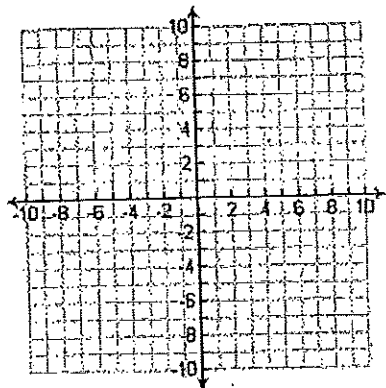
Point: (_____, _____)



13. $y + 2 = -2(x - 1)$

Slope: _____

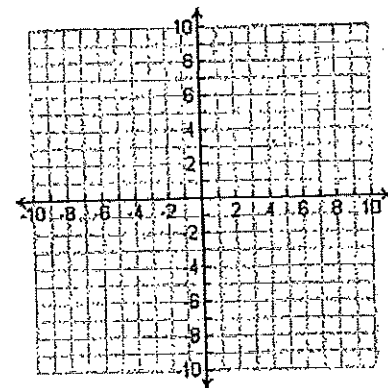
Point: (_____, _____)



14. $y + 3 = \frac{5}{3}(x + 8)$

Slope: _____

Point: (_____, _____)



For #15-17, find the intercepts of the equation. Show your work (substitute 0 in for x or y and solve for the other variable).

15. $x + y = 7$

x-intercept: (_____, _____)

y-intercept: (_____, _____)

16. $2x - y = 8$

x-intercept: (_____, _____)

y-intercept: (_____, _____)

17. $3x - 4y = 10$

x-intercept: (_____, _____)

y-intercept: (_____, _____)

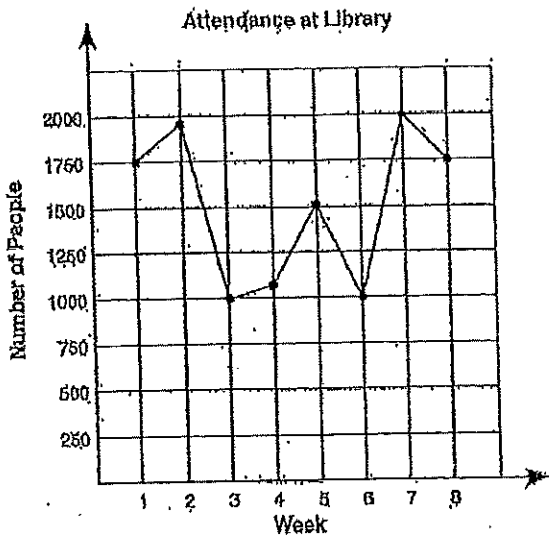
Week 7

Part II: Statistics Summer Math Packet

Name: _____

Date: _____

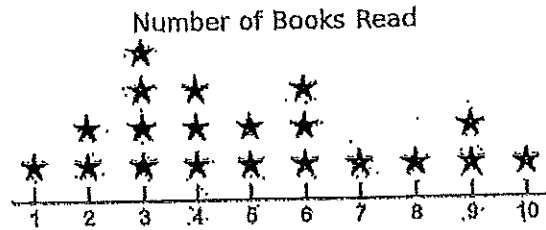
1. The graph shows the number of people who visited the library each week over an eight-week period.



Which is the best estimate of the mean number of people visiting the library in one week?

- A. 1000 B. 1500 C. 1650 D. 1750

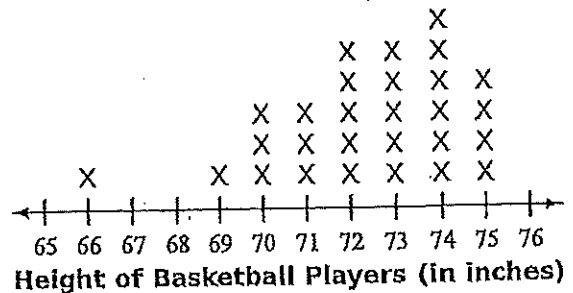
2. The line plot shows the number of books read by the students in Marco's class last summer.



What was the mean (average) number of books read?

- A. 2 B. 3 C. 5 D. 10

3. The line plot below shows the heights, in inches, of 28 basketball players.



Based on the line plot, which of the following is true?

- A. The mean is greater than the mode.
 B. The median is greater than the mode.
 C. The mean is greater than the median.
 D. The median is greater than the mean.

4. This stem-and-leaf plot shows the number of scooters sold for several months.

Scooters Sold	
0	3 3 5 7
1	4 8 9 9
2	0 0 1 3 4 4 7 7 8 8 8 9
3	2 2 3 4 7 7 8
4	5 6 6

1 | 9 represents 19 scooters

Which number is the mode in this plot?

5. Jacob made the stem-and-leaf plot below to show the number of minutes per day he spent playing video games over a 10-day period.

Minutes Spent Playing Video Games	
6	5
7	5 6 7
8	1 3 3 5
9	1 4

Key
7 | 5 represents 75

What is the mean of the set of data in the stem-and-leaf plot?

- A. 81 B. 82 C. 83 D. 85

6. The price, in cents, of each item in a vending machine is shown in the stem-and-leaf plot below.

Prices of Items in Vending Machine	
3	0 5
4	0 0 0 5
5	0 0 5 5 5
6	0 5
7	5 5 5 5
8	0
9	5

Key
3 | 5 represents 35 cents

What is the range of the prices of the items?

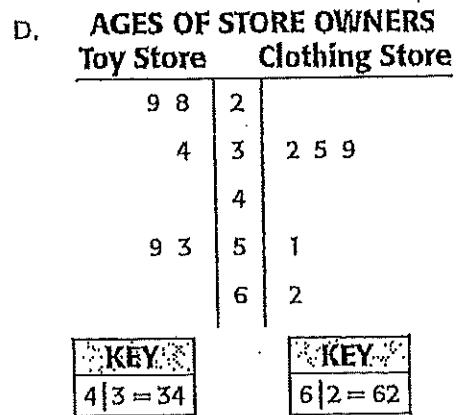
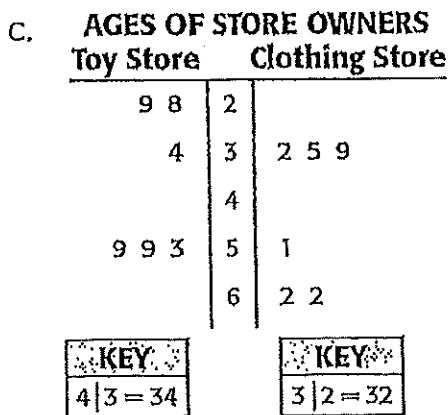
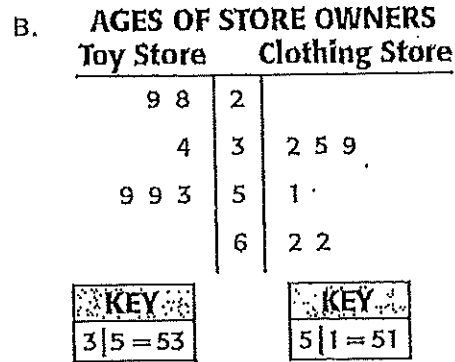
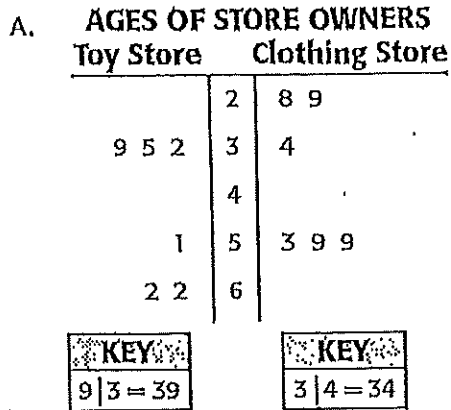
- A. 55 cents B. 60 cents
C. 65 cents D. 75 cents

7. This table lists the ages of 12 store owners.

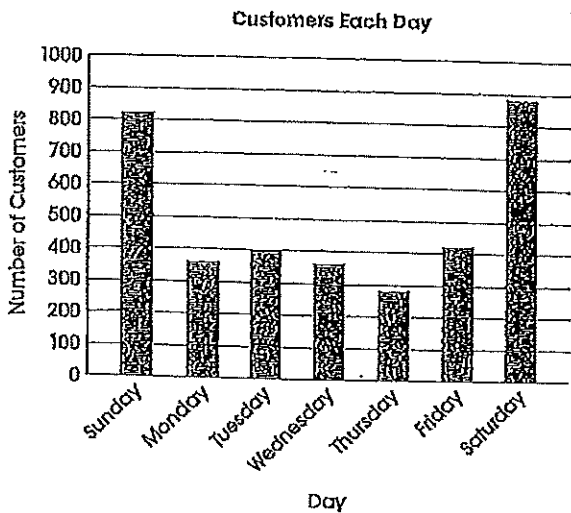
AGES OF STORE OWNERS

Toy Store	Clothing Store
28, 29, 34,	32, 35, 39,
53, 59, 59	51, 62, 62

Which stem-and-leaf plot correctly displays the data?



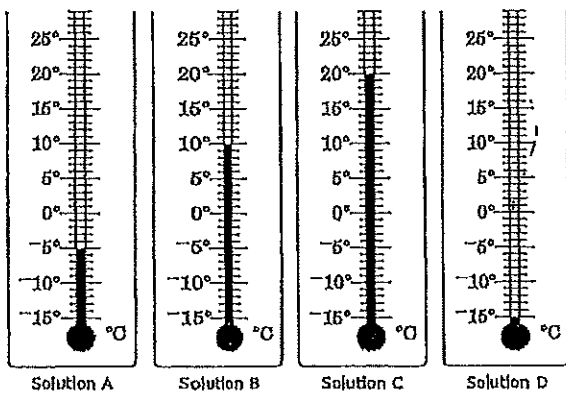
8. The bar graph shows the number of customers in Rios restaurant each day last week.



What is the approximate mean number of customers per day in Rios restaurant last week?

- A. 360 B. 400 C. 440 D. 500

9. The thermometers below show the Celsius temperatures of four different solutions.



What is the range of the temperatures of the solutions?

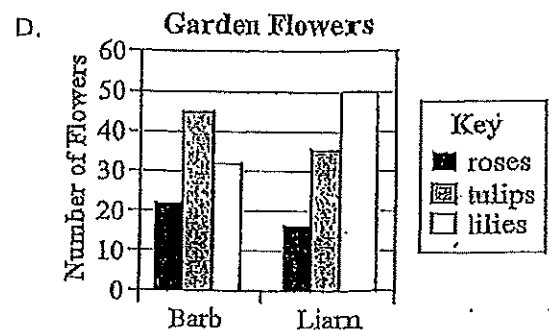
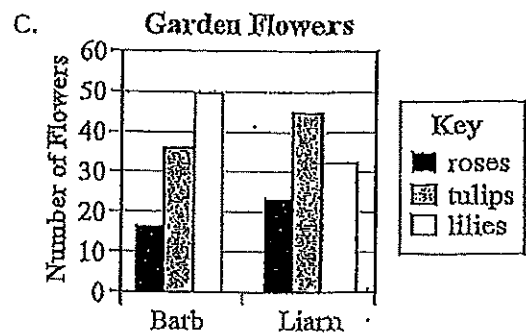
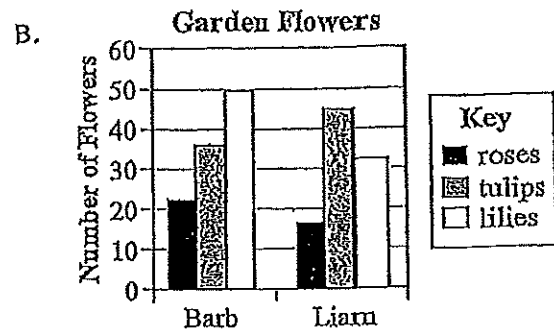
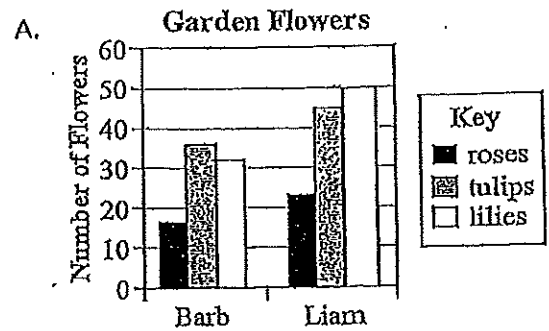
- A. -5°C B. 5°C C. 20°C D. 35°C

10. The table below shows how many flowers of each type Barb and Liam have in their gardens.

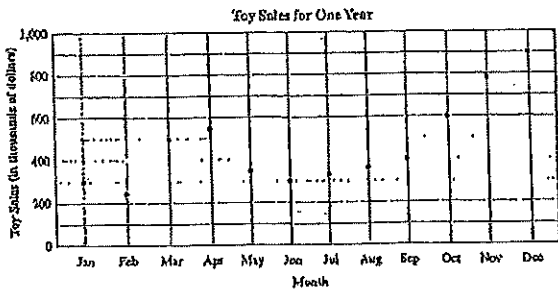
Garden Flowers

	Barb	Liam
roses	23	17
tulips	45	36
lilies	32	50

Which graph represents the data?



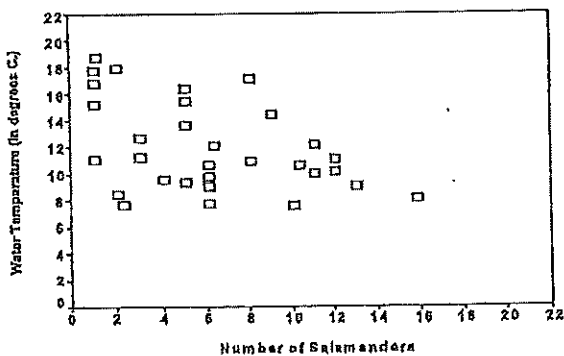
11. The graph below shows the amount of monthly sales at a local toy store during one year.



Based on the graph, which is the closest *estimate* of the *range* in the amount of monthly sales at the store during the year?

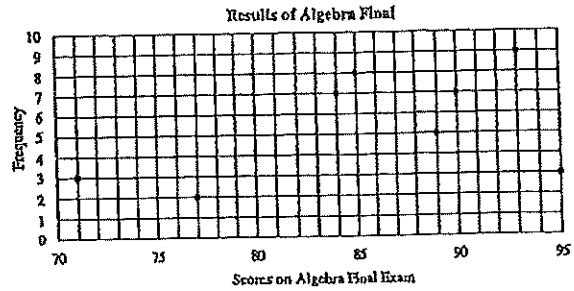
- A. \$650,000 B. \$600,000
C. \$350,000 D. \$300,000

12. According to the plot below, what is the range of water temperatures in which you would expect to find salamanders?



- A. between 0 and 22 degrees
B. between 7 and 19 degrees
C. between 0 and 7 degrees
D. between 1 and 16 degrees

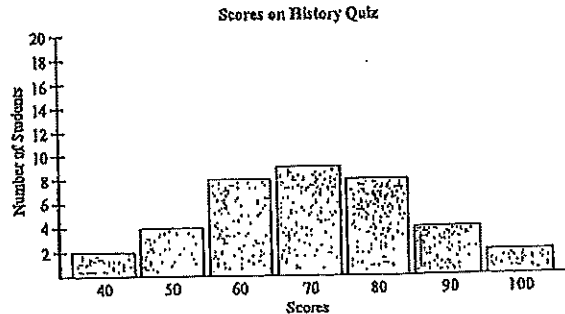
13. The graph below shows the frequency of test scores on the algebra final exam.



What is the *mode* of the algebra final exam scores?

- A. 88 B. 89 C. 93 D. 95

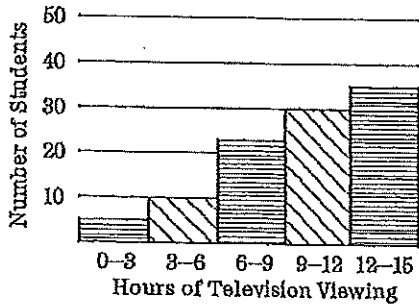
14. The bar graph below shows a group of students' scores on a history quiz.



Which of the following statements is *not* correct?

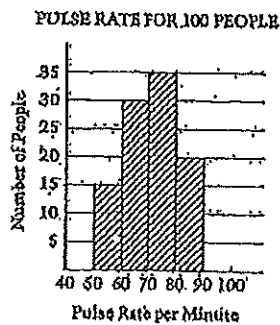
- A. Thirty-seven students took the quiz.
B. The mode score was 70 on the quiz.
C. The mean and median scores on the quiz are the same.
D. Exactly 50% of the students scored 70 or higher on the quiz.

15. The histogram shows the weekly television viewing times of 100 students. How many students watch television between 9 and 12 hours each week?



- A. 40 B. 30 C. 35 D. 25

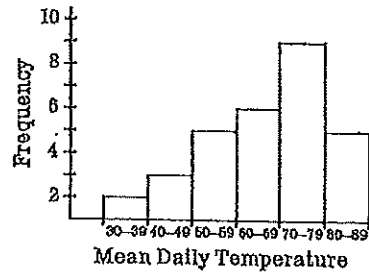
16.



The pulse rate for a group of 100 people is shown in the graph above. What is the average pulse rate per minute for these 100 people? (Note: Use the midpoint of each interval to represent the pulse rate for the entire interval. For example, 55 would be used for the pulse rate of the 15 people in the 50-60 group.)

Answer: _____

17. Based on the data displayed in the histogram, can you determine the true mean temperature for the month of June or just an approximation? Explain your answer.



18. Create a histogram from the following data which were collected by the quality assurance division of a bottling plant with respect to the volume of cola in 2-liter bottles: 2.1, 2.1, 1.9, 1.8, 2.2, 2.2, 2.1, 2.1, 2.0, 1.8, 1.9, 1.9, 1.9, 2.1, 1.8, 1.9, 2.0, 2.1.

19. Sina's goal is to exercise a mean of 45 minutes per day for one week. For the first 6 days of the week, she exercised 35, 40, 37, 42, 45, and 50 minutes.

What is the number of minutes Sina must exercise on the 7th day of the week to reach her goal exactly?

- A. 21 minutes B. 42 minutes
C. 49 minutes D. 66 minutes

20. While summarizing payroll reports for her company, Ms. Walthers noticed that the mean salary in the firm was \$32,500 while the median salary was only \$28,200. What must be true regarding paychecks at this company?

- A. There is at least one paycheck that is significantly less than the median payroll amount.
- B. There is at least one paycheck that is significantly greater than the median payroll amount.
- C. All paychecks in the company are relatively similar.
- D. The mode must be between \$28,200 and \$32,500.

21. An antique dealer bought 5 different antiques and had them appraised.

- The least expensive antique was appraised at \$75.00.
- The range of appraisals was \$300.00.
- The mode was \$75.00.
- The median was \$205.00.
- The mean (average) was \$210.00.

What were the appraisals on each of the 5 antiques? Show your work or explain how you found your answer.

22. There are 10 people in an elevator, four women and six men.

The average weight of the women is 120 pounds, and the average weight of the men is 180 pounds.

What is the average weight of the ten people in the elevator? Show how you found your answer and explain your thinking.

23. Mr. Young wrote five numbers on the board in his classroom. After class, one of the numbers was erased. Four of the five numbers are shown below.

18 25 30 17 ?

If the median of the five numbers that Mr. Young wrote on the board was 18, which of the following could be true?

- A. The number that was erased was greater than 30.
- B. The mode of the five numbers Mr. Young wrote on the board was 24.
- C. The mean of the five numbers Mr. Young wrote on the board was 22.6.
- D. The number that was erased was less than or equal to 18.

24. The cholesterol levels of 5 people are shown in the chart below.

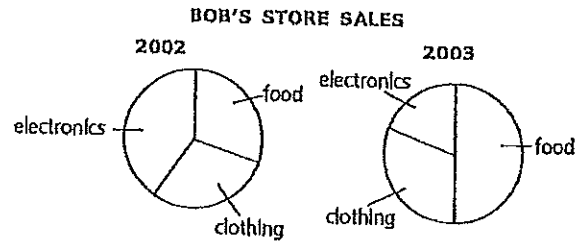
Cholesterol Levels

Person	Cholesterol Level
1	203
2	188
3	205
4	215
5	212

If the cholesterol level of person 4 decreases from 215 to 210, how will the median of the data be affected?

- A. The median will increase.
- B. The median will decrease.
- C. The median will stay the same.
- D. There is not enough information given to determine how the median is affected.

25. The percent of different types of items sold at Bob's store for the years 2002 and 2003 are shown in the circle graphs below.



Which table shows the data in the circle graphs?

A. **BOB'S STORE SALES**

Item	Percent in 2002	Percent in 2003
food	25	50
clothing	25	30
electronics	50	20

B. **BOB'S STORE SALES**

Item	Percent in 2002	Percent in 2003
food	30	10
clothing	30	20
electronics	40	30

C. **BOB'S STORE SALES**

Item	Percent in 2002	Percent in 2003
food	33	50
clothing	33	20
electronics	33	30

D. **BOB'S STORE SALES**

Item	Percent in 2002	Percent in 2003
food	30	50
clothing	30	30
electronics	40	20

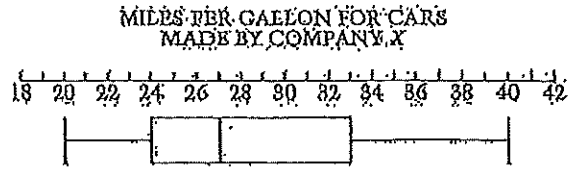
26. A local jeweler began a sale on Monday. It was 70% off the ticket price. The following Friday he advertised an additional 35% off the original ticket price. Do you find this hard to believe? Explain.

27. Last week Robin did 30 sit-ups in one minute. Today, she did 45 in one minute. Her coach told her she had improved 150%. Is this correct? Explain.

28. An election involving four candidates for mayor has been held. Of the following, which is the best way to present the percentage of votes each candidate received?

- A. Circle graph B. Box plot
C. Scatterplot D. Histogram

29.



According to the box-and-whisker plot above, three-fourths of the cars made by Company X got fewer than how many miles per gallon?

- A. 20 B. 27 C. 33 D. 40

30. One thousand people selected at random were questioned about smoking and drinking. The results of this survey are summarized in the table below. Calculate the probability that a randomly selected respondent drinks and smokes.

	Smokers	Non-smokers
Drinkers	320	530
Non-drinkers	20	130

