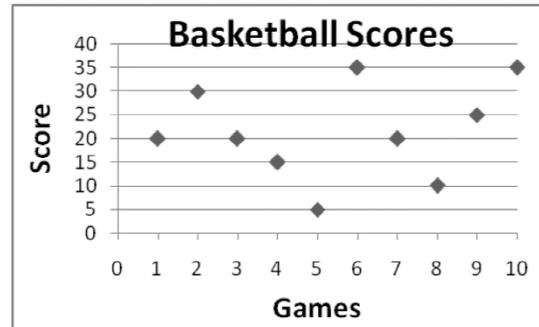
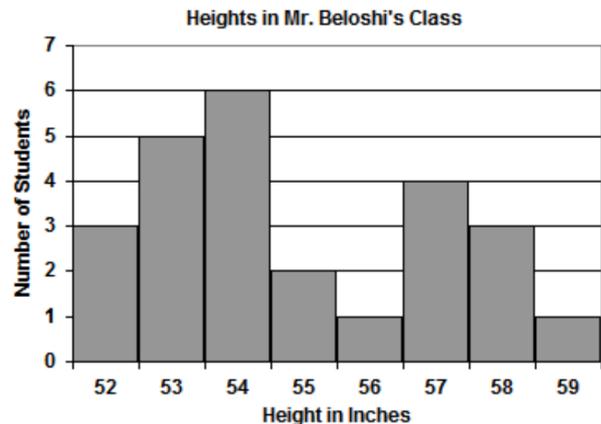


- Shooter's basketball team played in ten games. The scores are charted as shown. Which one is greater, the mean or the mode? By how much is it greater?
- Randy opens up a bag of jelly beans after mixing them up. He pours out 10 and counts 4 red ones in the bunch. He wants to practice his knowledge of statistics and has his brother count all the jelly beans in the bag in another room. There are 160 according to his brother. Based on Randy's sample, about how many red jelly beans should be in the bag?

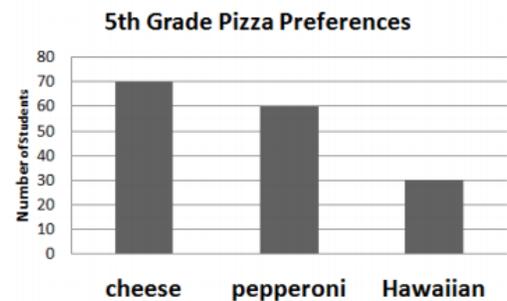


- The students in Mr. Beloshi's class are working in groups to draw a life size average fifth grader for their class of 25 students. Group A has gathered data about all the fifth graders in their class. Heights to the nearest inch are shown in the bar graph. To the nearest inch, what is the mean height and what is the median height?



- Toni's teacher gives a 20 point quiz every Friday. On her first five quizzes Toni has scores: 12, 10, 11, 20, and 12. What are the possible quiz scores for the next quiz that would keep the median the same but raise Toni's average? Quiz scores are whole numbers.
- A gum ball machine is filled with an equal number of white, blue, yellow, green, and purple gum balls. You cannot control which color you get from the machine and the gum balls cost 25 cents each. How much would you have to spend to be sure of getting 3 gum balls of the same color?
- The average (mean) of 3 numbers is 21. If the smallest number is removed, the average of the remaining 2 numbers is 27. What is the value of the number that was removed?
- The 78 fifth graders at Cascade Ridge Elementary all have one or more siblings. 51 of them have at least one sister and 63 have at least one brother. How many have at least one sister and one brother?

- Sol takes a survey of the entire 5th grade class on the kinds of pizza they would enjoy eating and presents his findings in the bar graph shown. He only offers three choices: cheese, pepperoni and Hawaiian. There are 90 students in the 5th grade class. At most how many students like only cheese pizza? (think of what the data might look like in a Venn Diagram).



BONUS PROBLEMS

9. The average of eight whole numbers is 8. If seven of these numbers are 1, then the eighth number must be what?

10. A student got the following scores on her first five weekly math quizzes: 65, 82, 38, 86, and 74. What is the least possible score she could get on the sixth quiz so that her median score would be 78?

11. At the beginning of the year, a business owed \$30,000 for a loan. The owner did the best he could to pay off this debt, and at the beginning of the next year the business only owed \$5904. What was the average monthly payment for this loan?

12. At the end of the year, during which there were 10 grueling mathematics tests, Grisham's average score was 70%. When looking at his final test though, he noticed there was a grading error which would raise that test's score from the original score of 40% to a new score of 70%. If all ten tests are weighted equally, what is his new average score for the year? Express your answer as a percent.

Solutions

1. The basketball scores, in order from smallest to largest, are:

5, 10, 15, 20, 20, 20, 25, 30, 35, 35

The mode (the most frequently occurring number) is 20.

The mean (the average) is:

$$\frac{5+10+15+20+20+20+25+30+35+35}{10} = \frac{215}{10} = 21.5$$

So, the mean is greater by 1.5.

Answer: Mean is greater by 1.5

2. Based on the sample four-tenths ($\frac{4}{10}$) of the jelly beans are red. So, if there are a total of 160 jelly beans in the bag, then:

$$\frac{4}{10} \times 160 = 64 \text{ red jelly beans}$$

Answer: 64 red jelly beans

3. Taking the data from the bar graph, the heights of all the fifth graders are:

52, 52, 52, 53, 53, 53, 53, 53, 54, 54, 54, 54, 54, 54, 55, 55, 56, 57, 57, 57, 57, 58, 58, 58, 59

The median is found by crossing off numbers from both ends of the list until you find the number in the middle:

~~52, 52, 52, 53, 53, 53, 53, 53, 54, 54, 54, 54, 54, 54, 55, 55, 56, 57, 57, 57, 57, 58, 58, 58, 59~~

So, the median is 54 inches.

The mean (average) is:

$$\frac{52 + 52 + 52 + 53 + 53 + 53 + 53 + 53 + 54 + 54 + 54 + 54 + 54 + 54 + 55 + 55 + 56 + 57 + 57 + 57 + 57 + 58 + 58 + 58 + 59}{25}$$

, which is:

$$\frac{1372}{25} = 54.88$$

Rounding to the nearest inch, the mean is 55 inches.

Answer: Median is 54 inches, and mean is 55 inches.

4. Putting Toni's scores in order from lowest to highest:

10, 11, 12, 12, 20

The current median (middle number) is 12. The current average is $(10+11+12+12+20) \div 5 = 13$. In order to raise the average, the next quiz score must be greater than the current average, which is 13. So the next quiz score would have to be 14, 15, 16, 17, 18, 19, or 20. All of these would also serve to keep the median at 12. With six quiz scores, you would have *two* numbers in the middle of the ordered list, and they would be 12 and 12, so the median stays at 12.

Answer: 14, 15, 16, 17, 18, 19, 20

5. In the unluckiest case, you would get 2 white, 2 blue, 2 yellow, 2 green, and 2 purple gum balls. You've now spent 10×25 cents = 250 cents, and you still don't have three gum balls of the same color. But buying one more gum ball guarantees that you will have three of the same color. So the total amount spent is 275 cents, or \$2.75.

Answer: \$2.75

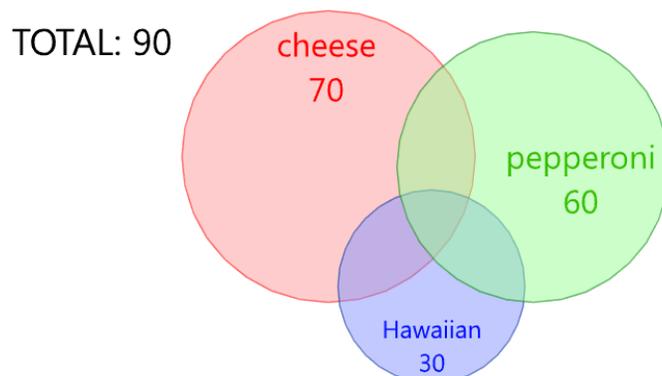
6. If the average of the original three numbers is 21, then the sum of those three numbers must be $21 \times 3 = 63$. If the average of the final two numbers is 27, then the sum of those two numbers must be $27 \times 2 = 54$. So, the number that was removed was $63 - 54 = 11$.

Answer: 11

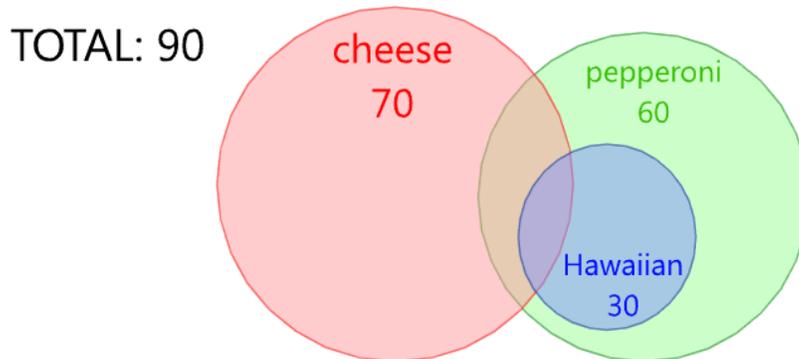
7. By adding 51 (those with sisters) + 63 (those with brothers) = 114, we've counted all the students, but we must have double-counted many students, because we know there are only 78 students total. So, we double-counted $114 - 78 = 36$ students. Those 36 students have both a sister and a brother.

Answer: 36 students

8. There are 90 students in the class. 70 of them like cheese, 60 like pepperoni, and 30 like Hawaiian. Our Venn diagram looks like this in general:



But, if we wish to maximize the number of students who only like cheese and nothing else, then we have to assume that all of the Hawaiian lovers are also pepperoni lovers. That way, we won't have any students who like only Hawaiian, leaving more students available for the other parts of the diagram. So our actual Venn diagram looks more like this:



So, for all practical purposes, we can ignore the Hawaiian lovers as they don't really impact the number of *only cheese* lovers. So we can just focus on the red and green circles. If the total number of students is 90, and 60 of them (the entire green circle) like pepperoni, then $90 - 60 = 30$ of them must like only cheese.

Answer: 30 students

9. If the average of eight numbers is 8, then the sum of those eight numbers must be $8 \times 8 = 64$.

If seven of those numbers are 1, then the eight number must be $64 - 7 = 57$.

Answer: 57

10. Putting the scores in order:

38, 65, 74, 82, 86

The only way to achieve a median of 78 is if the middle two scores are 74 and 82. So the sixth quiz has to be 82 or higher.

Answer: 82

11. During the course of the year, he paid off:

$$30,000 - 5,904 = 24,096$$

So he paid \$24,096 over the course of 12 months, so the average monthly payment is:

$$24,096 \div 12 = 2,008$$

Answer: \$2,008

12. If the original average of ten test scores was 70, then the total of all ten test scores must be:

$$10 \times 70 = 700$$

But now his last test score is being increased by 30 points, so the new total sum will be 730. His new average is:

$$730 \div 10 = 73$$

Answer: 73%