IM 9–12 MATH v.1

Lesson 13

More Standard Deviation

Learning Goal

Algebra 1

Let's continue to interpret standard deviation.

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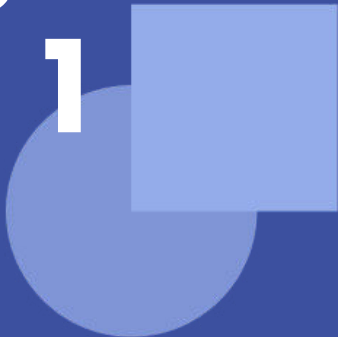
Evaluate mentally.

$0.5 \cdot 30$

$1.5 \cdot 30$

$100 - 1.5 \cdot 30$

$100 - 1.5 \cdot 18$

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Unit 1 ● Lesson 13 ● Activity 1
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Info Gap: African and Asian Elephants

Data Card Student

Silently read the data card.

What specific information do you need?

Why do you need to know... (that piece of information)?

Listen to your partner's reasoning and ask clarifying questions.

Read the problem card, and solve the problem independently.

Share the data card with your partner, and discuss your reasoning with your partner.

Problem Card Student

Silently read the problem card.

Can you tell me... (a piece of information I need)?

I need that piece of information because...

Share the problem card with your partner, and solve the problem independently.

Read the data card, and discuss your reasoning with your partner.

After both rounds, discuss differences in the problems and strategies.

First, we will conduct a demonstration with the whole class. As a class, you are playing the role of the person with the problem card while I play the role of the person with the data card.

It is the job of the person with the problem card (in this case, all of you) to think about what information you need to answer the question.

Problem:

100 captive Asian elephants and 100 wild Asian elephants are weighed. Is there a significant difference between the weights of the two groups of elephants? Explain your reasoning.

What specific information do you need to find out if there is a significant difference between the weight of captive and wild Asian elephants?

Unit 1 ● Lesson 13 ● Activity 2

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Info Gap: African and Asian Elephants

Data Card

- *The distribution of weights for each set of elephants is approximately symmetric.*

Captive Asian elephants:

- *Mean weight of captive elephants: 3,073 kg*

- *Standard deviation of captive elephant weights: 282 kg*

- *Median weight of captive elephants: 3,055 kg*

- *IQR of captive elephant weights: 399 kg*

Wild Asian elephants:

- *Mean weight of wild elephants: 2,373 kg*

- *Standard deviation of wild elephant weights: 121 kg*

- *Median weight of wild elephants: 2,386 kg*

- *IQR of wild elephant weights: 163 kg*

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Unit 1 ● Lesson 13 ● Activity 2
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Your teacher will give you either a problem card or a data card. Do not show or read your card to your partner.

If your teacher gives you the data card:

1. Silently read the information on your card.
2. Ask your partner "What specific information do you need?" and wait for your partner to ask for information. Only give information that is on your card. (Do not figure out anything for your partner!)
3. Before telling your partner the information, ask "Why do you need to know (that piece of information)?"
4. Read the problem card, and solve the problem independently.
5. Share the data card, and discuss your reasoning.

If your teacher gives you the problem card:

1. Silently read your card and think about what information you need to answer the question.
2. Ask your partner for the specific information that you need.
3. Explain to your partner how you are using the information to solve the problem.
4. When you have enough information, share the problem card with your partner, and solve the problem independently.
5. Read the data card, and discuss your reasoning.

- What was interesting about Problem Card 1?

- Was it more appropriate to use the mean or the median to compare the typical weights for Problem Card 1? Why?

- Which measure of variability did you choose to compare for Problem Card 1? Why?

- What was challenging about Problem Card 2?

- How do you know your dot plot is correct?

For each situation, you are given two graphs of data, a measure of center for each, and a measure of variability for each.

- Interpret the measure of center in terms of the situation.

- Interpret the measure of variability in terms of the situation.

- Compare the two data sets.

1. The heights of the 40 trees in each of two forests are collected.

mean: 44.8 feet, standard deviation: 4.72 feet

tree height in forest A (feet)
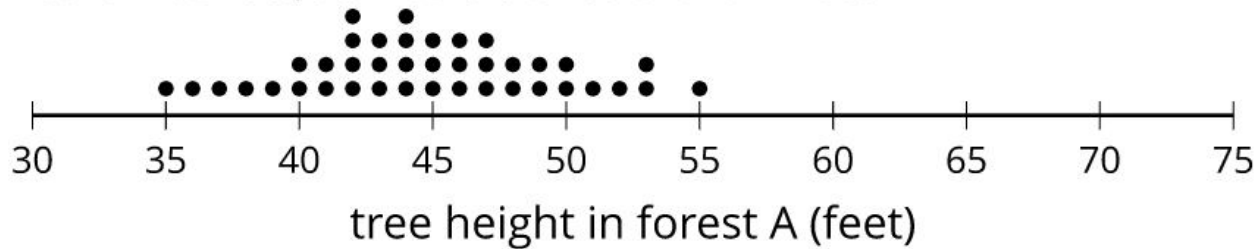
mean: 56.03 feet, standard deviation: 7.87 feet

tree height in forest B (feet)
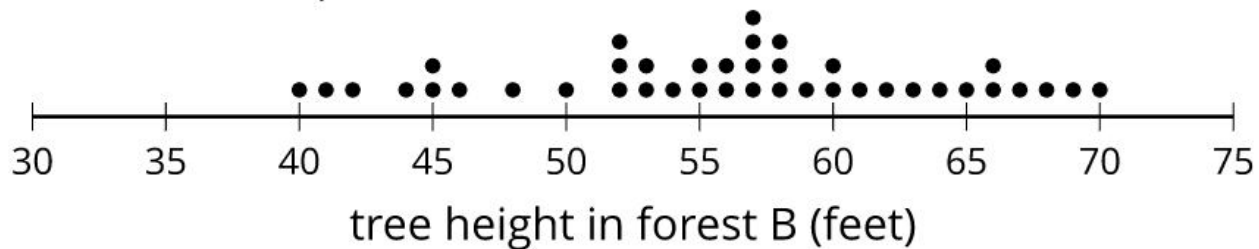
2. The number of minutes it takes Lin and Noah to finish their tests in German class is collected for the year.

mean: 29.48 minutes, standard deviation: 5.44 minutes

time to finish test for Lin (min)
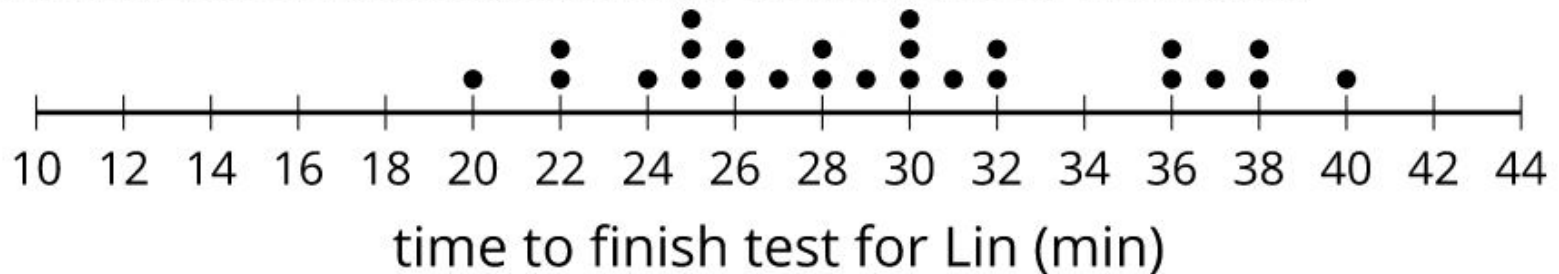
mean: 28.44 minutes, standard deviation: 7.40 minutes

time to finish test for Noah (min)
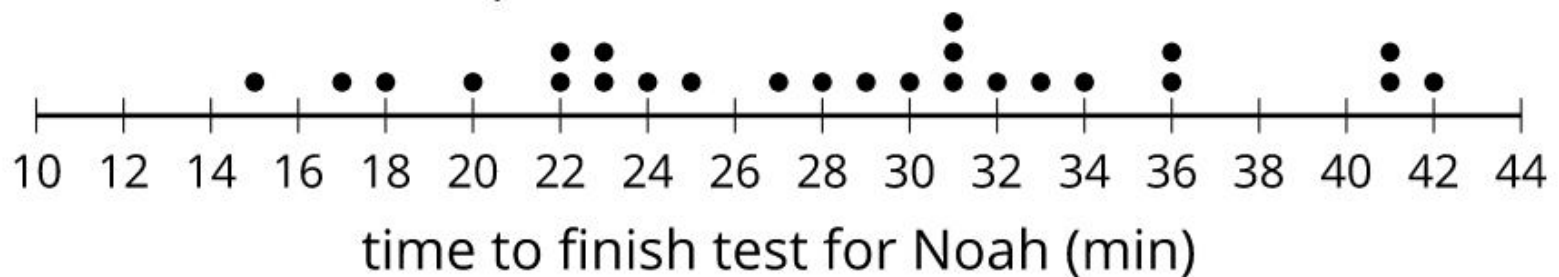
The number of raisins in a cereal with a name brand and the generic version of the same cereal are collected for several boxes.

mean: 289.1 raisins, standard deviation: 19.8 raisins

number of raisins in brand cereal
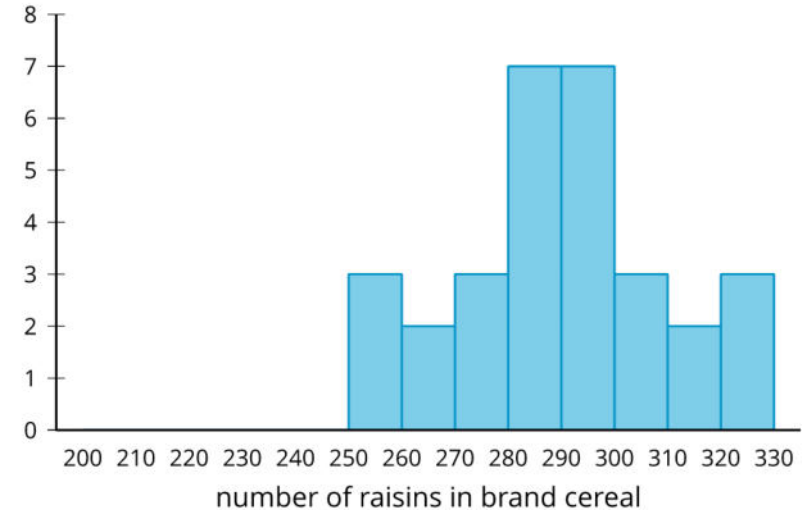
mean: 249.17 raisins, standard deviation: 26.35 raisins

number of raisins in generic cereal

More Standard Deviation
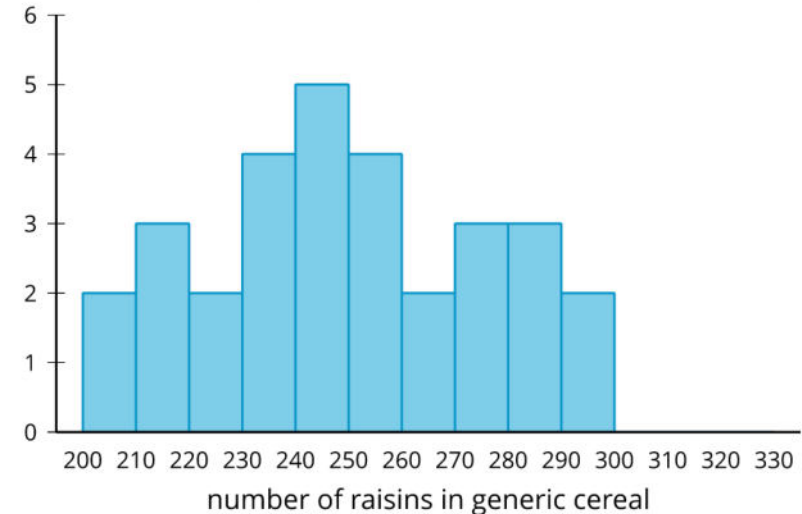
- What information does standard deviation tell you about a data set?

- Two professional race car drivers have the same average lap times after fifty laps. What does it mean to say that the first driver's lap times have a greater standard deviation than the second driver's lap times?

- In one class, students had an average height of 68 inches and a standard deviation of 5 inches. In a second class, the students had an average height of 67 inches and a standard deviation of 3.5 inches. What differences would you expect to see if you looked at the dot plots that represent the distributions of data for each class?

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I can use standard deviation to say something about a situation.

Learning Targets

Algebra 1

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A college is looking at the data for its most recent college graduates based on their major.

- The mean salary of 100 recent college graduates who majored in engineering was $63,750 with a standard deviation of $10,020.

- The mean salary of 100 recent college graduates who majored in business was $52,200 with a standard deviation of $19,400.

- The mean salary of 100 recent college graduates who majored in the social sciences was $45,230 with a standard deviation of $6,750.

Match each histogram to the majors based on the description.

- engineering

- business

- social sciences

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Unit 1 ● Lesson 13 ● Activity 4
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1.
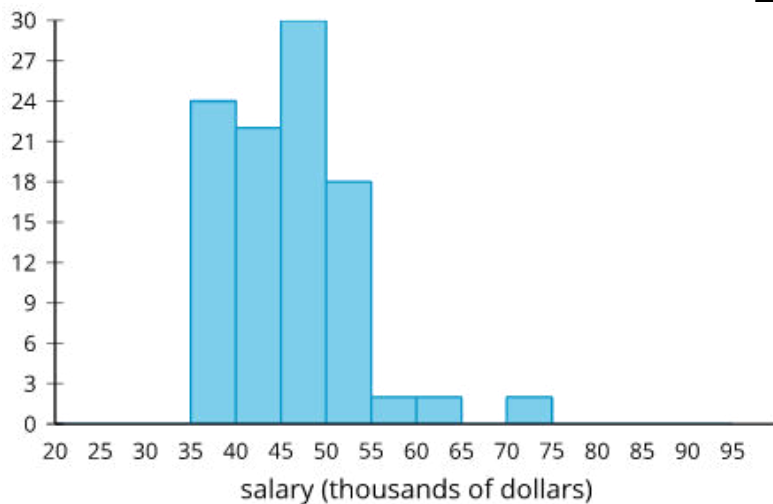
2.
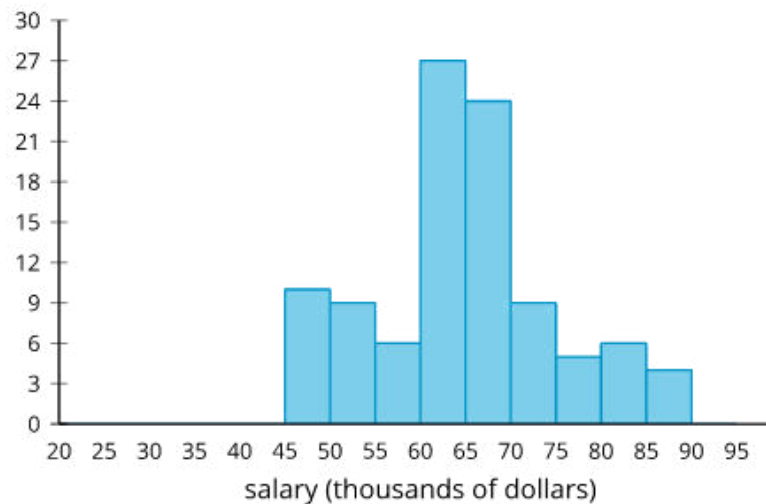
3.
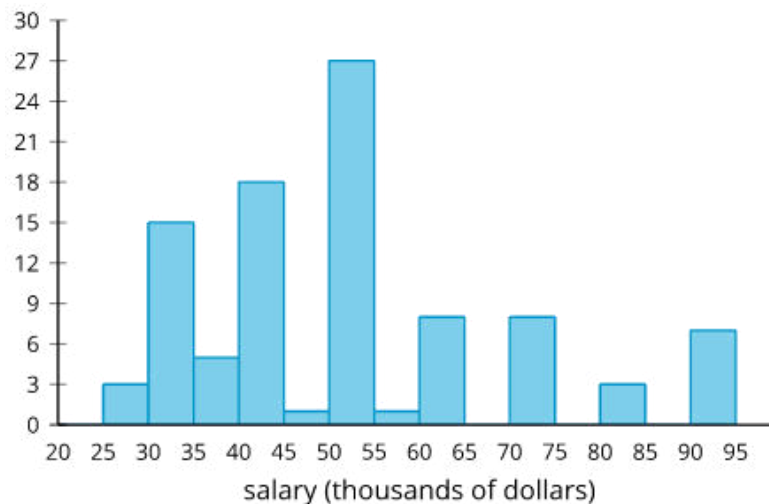
standard deviation

A measure of the variability, or spread, of a distribution, calculated by a method similar to the method for calculating the MAD (mean absolute deviation). The exact method is studied in more advanced courses.

statistic

A quantity that is calculated from sample data, such as mean, median, or MAD (mean absolute deviation).

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