The Need for Change in Our Educational System: College and Career Readiness

Students are entering into a world that most of us would have found hard to contemplate even 10 or 15 years ago. Looking at some of the recent advances in technology, such as the iPhone and the iPad or, even more dramatic, Google glasses and Google cars, we recognize that the future for our students will look significantly different than it did for us. But is our current educational system successfully preparing students for life after high school? Will they be competitive in a global economy? Many organizations say no.

The National PTA Website states, *"American students are poorly prepared for college and career. Today, most good jobs require some type of postsecondary education or training. Yet, our education system is falling short in preparing students to succeed in higher education."* The Business Sign-on Letter in Support of the Common Core State Standards (CCSS) states, *"Unfortunately, today, too few high school students graduate and, among those who do, too few graduate well-prepared for life after high school. In order to prepare today's students for the challenging world they will encounter, it is critical that we set the right expectations."* The American Management Association, in an article announcing the results of their December 2012 Critical Skills Survey results, states "*Executives admit that the majority of their workforce is average—or below average —in communication skills (62%), creativity (61%), collaboration (52%), and critical thinking (49%)."* In today's global economy, it is important to consider how our students are performing on an international level. PISA is an international study that aims to evaluate 15-year-olds' competencies in the key subjects, including mathematics. Test results from the 2009 study ranked the United States as #31 out of the participating sixty-five countries (Shanghai ranked #1; Canada ranked #10).

The Common Core State Standards - A Response to the Need

The Common Core State Standards (CCSS) effort for English Language Arts and Mathematics was launched in June 2009, and now adopted by 45 states and the District of Columbia. The Mission Statement for the CCSS states, "*The standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that our young people need for success in college and careers. With American students fully prepared for the future, our communities will be best positioned to compete successfully in the global economy*." According to Michael Casserly, Executive Director, Council of the Great City Schools, *"The common core standards finally make real the promise of American public education to expect the best of all our schoolchildren."*

What's Different about the CCSS and Our Current Standards?

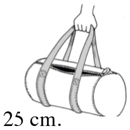
The CCSS-Mathematics (CCSS-M) are composed of both content standards and Standards for Mathematical Practice (SMP). The content standards describe the mathematical topics to be taught at each grade level while the SMP describe the "habits of mind" of the mathematically proficient student. The SMP will be the greatest change for how teachers facilitate learning in their mathematics classrooms. This will change the focus from a teacher-centered classroom to a student-centered classroom in which teachers guide students toward conceptual understanding of the mathematics, provide them with larger tasks that involve 'clusters' of standards, and provide opportunities for mathematical discourse where students effectively communicate their understanding both orally and in writing. Understanding mathematics will be developed along with the necessary skills and procedures.

Next Generation Assessments

The innovative and comprehensive assessment system for grades 3-8 and high school in English Language Arts and Mathematics will be operational in the 2014 – 2015 school year. It will have more rigorous tests measuring student progress toward “college and career readiness.”

Interim and end-of-the-year assessments will look different than the multiple choice questions on current standardized tests. Test items will include large performance tasks, constructed response and selected response type questions. An example of a “more complex and non-routine mathematics” task is shown at right.

CR 3: Sports Bag



You have been asked to design a sports bag.

- The length of the bag will be 60 cm.
- The bag will have circular ends of diameter 25 cm.
- The main body of the bag will be made from 3 pieces of material; a piece for the curved body, and the two circular end pieces.
- Each piece will need to have an extra 2 cm all around it for a seam, so that the pieces may be stitched together.

1. Make a sketch of the pieces you will need to cut out for the body of the bag. Your sketch does not have to be to scale. On your sketch, show all the measurements you will need.
2. You are going to make one of these bags from a roll of cloth 1 meter wide. What is the shortest length that you need to cut from the roll for the bag? Describe, using words and sketches, how you arrive at your answer.

A released item from the SMARTER Balanced Assessment Consortium Grade 8 Assessment Sampler

CPM Educational Program, A CCSS-Aligned Curriculum, Meets the Challenge

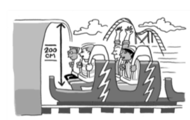
CPM was established through grant funding in 1989, and is a non-profit educational consortium managed and staffed by middle school and high school teachers who have collaborated with university mathematicians to develop a complete, student-centered mathematics program for 6^{th}-12^{th} grade. The principles of the CPM program are similar to – and predate – the Standards for Mathematical Practice. For 20 years CPM authors have organized the curriculum into large tasks that connect mathematical ideas over time, which parallels the intent of the CCSS. The Standards for Mathematical Practice (SMP) are evident in each of the CPM Common Core-aligned textbooks in the form of rich, coherent tasks and study team strategies that give students access to conceptual understanding of the mathematics.

CPM recognizes that change takes time and provides support for teachers, students, and parents (see these resources at www.cpm.org). To meet the challenge of the CCSS and SMP, CPM includes:

1. Teacher notes for each lesson including:
   - the lesson objective
   - Standards for Mathematical Practice applicable to that lesson
   - study team strategies to facilitate team collaboration and mathematical discourse
   - a suggested lesson activity that provides insight about the lesson as well as guiding questions to facilitate student understanding
   - universal access strategies
   - team roles to create a sense of community among students and a responsibility to their team
   - closure suggestions to maximize student understanding of the key concepts of the lesson
2. A teacher's eBook (student eBooks are available for purchase)
3. Parent Guides with extra practice
4. Online homework help for students
5. Instructions and videos for using TI graphing calculators and eBooks
6. Professional development for teachers

Large tasks are embedded throughout the curriculum to prepare students for conceptual understanding of the mathematics. *(Visit www.cpm.org.)*

NEWTON’S REVENGE Task



Have you heard about Newton’s Revenge, the new roller coaster? It’s so big, fast, and scary that people are already starting to talk. Some people are worried about the tunnel that thrills riders with its very low ceiling.

The closest the ceiling of the tunnel ever comes to the seat of the roller-coaster car is 200 cm. Although no accidents have been reported yet, rumors have been spreading that very tall riders have broken their arms as they went through the tunnel with their arms raised over their heads. Unfortunately, due to these rumors, many tall people have stopped riding the coaster.

<u>Your Task</u>: Consider how you could determine whether the tunnel is actually safe for any rider, no matter how tall. Discuss the questions below with your team. Be ready to share your responses with the rest of the class.

Lesson 1.1.4 How can I use data to solve a problem?

Collecting, Organizing, and Analyzing Data

Lesson Objective: This lesson will introduce scatterplots as tools for organizing data and making predictions. Students will learn the importance of carefully scaling the axes of a graph. Also, students will be introduced to the concept of dependent and independent measurements.

Mathematical Practices: This lesson is an introduction to **modeling with mathematics**. Students will collect and graph data, then use it to identify a trend and answer questions relating to the data. They will find an actual equation for their model in Chapter 7.

Length of Activity: Two days (approximately 90 minutes)

Core Problems: Day 1: Problems 1-24 through 1-25

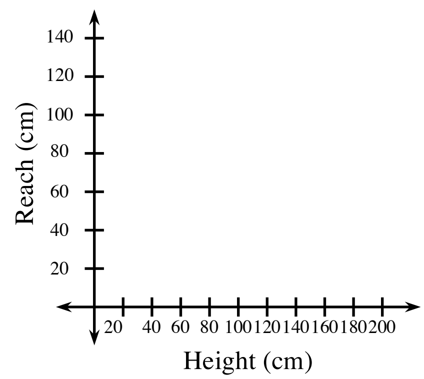
Day 2: Problems 1-26 through 1-28

Note on lesson timing: If you want your students to spend time doing the optional poster for this lesson, then is it suggested that you complete through problem 1-26 on Day 1.

Materials: Masking tape (optional)

Meter sticks or measuring tapes, one per team

Poster graph paper with pre-made set of axes for class data, scaled as shown in the diagram at right



Sticky dots, one per student

Lesson 1.1.4 Resource Page ("General Team Roles"), one per team and one for board display (optional)

Note: The Lesson 1.1.4 Resource Page ("General Team Roles") is listed as an optional resource throughout many of the lessons in the rest of the text. When you see General Team Roles Resource Page listed, it is the Lesson 1.1.4 Resource Page that is being referenced.

You may want to laminate individual copies of this resource page for students to use in their teams for the remainder of the school year. The resource page is designed with a place to put student names. You can use removable labels on the laminated sheets for assigning students to roles.

Lesson Overview: Students collect data comparing their height and reach while seated. (Interpret "reach" as the distance from the seat of a student's chair where he or she is sitting to the tips of the fingers of his or her raised arms.) After collecting this data, students use a scatter plot to determine whether a roller-coaster tunnel is safe for very tall riders.

Note: Since this activity will be revisited in Chapter 7, be sure to keep a copy of the class data.

Suggested Lesson Activity:

Day 1: After introducing the lesson, ask a student volunteer to read the problem statement for problem 1-24, "Newton's Revenge." This problem begins with a brief team brainstorm, which is intended to help students understand the point of the task and begin considering strategies to solve it. This is called a Teammates Consult (or Pencils in the Middle). All students put their pencils in the middle of the table to start the problem and may not pick them up until the teacher gives them permission. The students read the problem together, either as a team (aloud) or individually (silently). Then each student thinks about the task, especially the Discussion Points. When you determine that everyone is finished thinking, have the teams discuss the task, what resources they need, what measurements need to be taken and strategies they will need to solve the problem. Then pull the class together and have teams share the strategies they came up with before moving teams on to problem 1-25.

Note: While problems 1-25 through 1-27 are written to help lead teams through the process of collecting and analyzing data, these problems can work well as the basis of a whole-class activity and discussion.

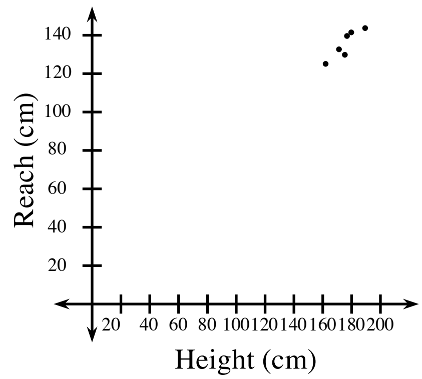
Use the results of the team discussion from problem 1-24 to start the process in problem 1-25, which focuses the task on specific math tools: gathering data, organizing it into a table, and graphing it to see the trend of the data. For example, if students suggest finding out how tall the world's tallest person is, you could point out that the problem is about reach from the seat, which is information they probably cannot get easily. If students are stuck, ask them questions such as, "*But whom could we get that data about?", "What data should we get?", "How would finding the reach for the students in our class help us predict the reach for an 8-foot-tall person?", "Once we have all that data, what can we do with it?",* or *"What can we do to help us see the data visually?"*

As a result of this whole-class conversation, students should recognize the usefulness of making both a table (with the columns labeled as in the sample below) and a graph (such as the one you will make before the lesson). To expedite measuring heights, either use masking tape with pre-marked measures on the wall or doorframe, or mark intervals on the board.

Note: It is intentional that the axes of the class graph are poorly designed. For example, students' dots are likely to be bunched up, and the graph does not allow them to predict the reach of a very tall person. This poor design creates the need for students to re-graph the data in their teams to help make a prediction. Do not discuss yet how you chose to set up the axes, as this is the purpose of problem 1-27.

After students collect data from their teammates, ask Recorder/Reporters to post the team data on the class table. All students should come up and add their individual data points to the class graph. Students can put their data up using sticky dots with their initials on them as their data points. The class data might look like this:

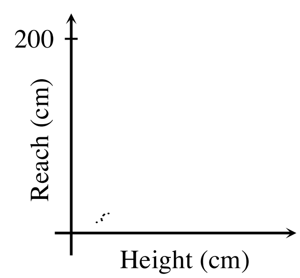
Height (cm)	Reach From Seat (cm)
172	133
163	126
174	130
177	140
188	144
179	142



Depending on your desired endpoint for this lesson on Day 2, this may be good place to stop for Day 1 or you may want to complete the next problem first (see note about lesson timing). If you stop here, then have students put their materials in a safe place.

Day 2: As a class, discuss the ideas in problem 1-26, which asks students to analyze the graph in terms of a trend and to consider the possibility of human error. You will need to help students see that, even though the points are scattered, they nevertheless show a pattern. This pattern can be used to help make predictions. Questions such as, *"What pattern do you see in the dots?"* and *"The dots are not scattered all over the paper – how do they seem to be clustered?"* may help students see the data as roughly linear.

Problems 1-27, 1-28, and 1-29 can be discussed within teams or with the whole class. Either way, the goal should be for teams to make decisions about how to set up a more useful graph, which might look like the one at right. Note that the axes were left un-scaled because your class data may be very different from the sample. The axes need to be scaled such that the points are not too bunched up and a prediction for $y = 200$ can be made and shown on the graph. These issues should emerge from the discussion of problem 1-27.



Note: This problem will be revisited in Chapter 7, so you should make sure that the data will be available. You may want to collect students' work and keep it in a file in the classroom, or place a copy in your Teacher Edition near Lesson 7.3.2.

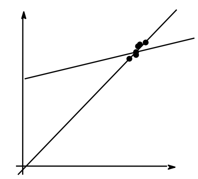
Closure:
(10 minutes)

Problem 1-29 asks students to refocus on the original question in the activity: Is the coaster safe for all riders? The answer will likely depend on several assumptions, especially where the line of best fit is drawn and how tall the tallest rider is likely to be. According to the *Guinness Book of World Records*, the world's tallest man was Robert Wadlow (1918-1940) from Illinois. He was 8 feet 11.1 inches (about 272 cm) tall.

At a minimum, each student should answer the question completely and clearly, including a strong justification for the solution. If teams have very different results, it would be appropriate to ask students to present their reasoning by making posters or showing their work on the document camera.

If no team thinks of drawing in a *line of best fit* as a way to show how they predicted the outcome, this would be a good time to introduce the idea.

After presenting that idea, ask teams to take a meter stick and add a line of best fit to their poster graphs. Then ask them to use that line to determine whether the ride is safe for Yao Ming. This question will be revisited in Chapter 7, when students will try to find the equation of their line of best fit.



It may be useful to show the difference between a line of best fit that fits the data well versus one that does not. An example of this appears above.

Universal Access: **Academic Literacy and Language Support –** After the introduction is read aloud show the students some real life examples of collected data. Some examples could be baseball statistics, results of a science experiment, or a school poll.

Have students read problem 1-24 aloud to their teams. This is a good problem to have the students connect to personal experiences. Open a discussion with "*Has anyone in class ridden a roller coaster?" "What are some of your favorite roller coasters?" What are some ways you show you are excited or scared while riding the roller coaster?"* This discussion will lend itself to the explanation of an important vocabulary word used in this problem, "reach". Give teams several minutes to review the task and to discuss the discussion points listed in the problem. Ask teams to share out their ideas and record the responses on the board.

It is important to let students work in their teams and explore their ideas regarding collecting and organizing the data. For problem 1-25 refer to the "Suggested Lesson Activity" notes.

Problem 1-26 has some challenging vocabulary. To support English Language Learners with the vocabulary work through this problem as a whole class. Introduce the vocabulary word "human error" by asking "*Are there any dots that seem out of place in relation to the rest of the dots?"* Discuss whether the dots seem to be in reasonable locations. To help students see the correlation between a person's height and their reach have several students of different height come to the front of the room. Have the students stand side by side to visibly show the difference in height followed by their reach. Reinforce the meaning of the vocabulary words "independent and dependent variable" by asking students to identify these variables in the real life examples of data presented at the beginning of class. Also, be sure to add them to the class word wall.

Problem 1-31 involves a box plot and problem 1-38 a stem and leaf plot.

These will be challenging problems for some students. If you suspect that your students will have trouble with these problems then do them as a whole class.

Team Strategies: The problems in this lesson require participation by every student to be successful. "Participation" means being active in the team discussion and explaining by giving reasons. All of the Team Roles are highlighted and important in this problem. Review the roles with the students if needed before the lesson begins. Or you might want to do a Participation Quiz where you are assessing the use of team roles.

For this lesson and those that follow, the General Team Roles are available (as the Lesson 1.1.4 Resource Page). As described in the "Materials" section of these teacher notes, copy the resource page so that you can display it on the board so that you can use it quickly for subsequent lessons.

The suggested team roles are reprinted below for your convenience.

Resource Manager:

- Get supplies for your team, and make sure your team cleans up.
- Make sure that everyone has shared all of their ideas and help the team decide when it needs outside help.
- Call the teacher over for team questions.
  "Does anyone have another idea? Are we ready to ask a question?"

Facilitator:

- Get your team started by having someone read the task out loud.
- Check that everyone understands what to work on.
- Make sure everyone understands your team's answer before you move on.
  "Does everyone understand how we got our answer? Are we ready to move on?"

Recorder/Reporter:

- Make sure that each team member can se the work the team is discussing.
- Make sure your team agrees about how to explain your ideas and each person has time to write their answer.
  "Do we all agree?"
  "Does anyone need more time?"
- Make sure that each member of your team is able to share ideas.
  "What do you think?"

Task Manager:

- Make sure no one talks outside your team.
- Keep your team on task and talking about math.
- Listen for statements and reasons.

"Why did you start that way?"
"Will you say more about what you mean?"

Homework: Day 1: Problems 1-30 through 1-34

Day 2: Problems 1-35 through 1-40

Notes to Self:

1.1.4 How can I use data to solve a problem?

Collecting, Organizing, and Analyzing Data

Computing batting averages, performing scientific experiments, and polling people during elections are just a few examples of how data can provide useful information when it is collected and analyzed. In this lesson, you will be collecting and organizing data to determine the potential danger of riding a roller coaster.

1-24. NEWTON'S REVENGE

Have you heard about Newton's Revenge, the new roller coaster? It is so big, fast, and scary that rumo about it are already spreading. Some people are worried about the tunnel that thrills riders with its lc ceiling.

The closest the ceiling of the tunnel ever comes to the seat of the roller-coaster car is 200 cm. Although no accidents have been reported yet, it is said that very tall riders have stopped riding the roller coaster.

Your Task: Consider how you could determine whether the tunnel is actually safe for any rider, no matter how tall. Discuss the questions below with your team. Be ready to share your responses with the rest of the class.

Discussion Points

What is this problem about? What is it asking you to do?
What information can help you answer this question?
How can you get the information you need?

1-25. One way to determine if the roller coaster is safe is to collect and analyze data.

a. Collect data from each member of your team.

Each member of the team needs to be measured twice. First, have one team member stand and have another team member measure his or her height. Second, have the same student sit in a chair or desk, raise his or her arms so that they are stretched as far as possible above his or her head, and measure the distance from the seat of the chair to his or her fingertips (called "the reach"). All measurements should be in centimeters.

Student Name	Height (cm)	Reach (cm)

Each person should record the team's data in a table like the one above.

b. Send one person up to record your team's data on the class table. Then add the rest of the class data to your own table. **[The results should resemble the example provided in the "Suggested Lesson Activity" notes.]**

c. Each person should put his or her initials on a sticky dot, then graph his or her own *height vs. reach* point on the class graph. **[The results should resemble the example provided in the "Suggested Lesson Activity" notes.]**

1-26. Use the class graph to answer the questions below.

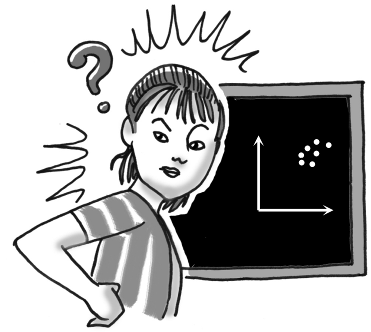
a. Are there any dots that you think show *human error*? That is, are there any dots that appear to be graphed incorrectly or that someone may have measured incorrectly? Explain why or why not. **[Answers vary.]**

b. Is a person's reach related to his or her height? That is, what seems to be true about the reach of taller people? Explain. **[Yes, the taller the person is, the longer his or her reach.]**

c. Since a person's reach depends on his or her height, the reach is called the **dependent** quantity (or variable) and the height the **independent** quantity (or variable). Examine the class graph of the data from problem 1-25. On which axis was the independent data represented? On which axis was the dependent data represented? **[The independent quantities were represented by the x-axis. The dependent quantities were represented using the y-axis.]**

d. Is there a trend in the data? How can you generalize the trend? **[Yes. A line of best fit can generalize the trend in the data.]**

1-27. Everyone is complaining about how the teacher made the class graph.



a. Jorge is confused about how the teacher decided to set up the graph. *"Why is it a 1^{st}-quadrant graph instead of a 4-quadrant graph?"* Answer Jorge's question. In general, how should you decide what kind of graph to use? **[The graph is in the first quadrant because negative lengths do not exist. The range of the data determines the kind of graph.]**

b. Lauren is annoyed with the x-axis. "*Why didn't the teacher just use the numbers from the table*?" she whined. "*Why count by twenties*?" What do you think? **[Counting by twenties makes the graph a reasonable size.]**

c. Hosai thinks that the graph is TOO BIG. "*The dots are all mashed together! Why did the teacher begin both the x- and y-axes at zero? Anyone that short would never be allowed on the roller coaster. Why not just start closer to the smallest numbers on the table?*" she asked. What do you think? **[In this situation, including the origin with the graph is not suggested; it is easier to see the line of best fit when the data points are not bunched together, and this can be done by changing the range of the graph to exclude the origin.]**

d. Sunita says the graph is TOO SMALL! "*If we're supposed to be using this data to check if the coaster is safe for really tall people, the graph has to have room to graph tall people's dots too*." Do you agree? If so, how much room do you think is needed? **[The graph should include heights for very tall people on the *x*-axis and the height of the tunnel on the *y*-axis.]**

1-28. Using all of your ideas from problem 1-27, make your own graph that will help you determine whether the ride is safe for very tall people. An example of a "very tall" person is Yao Ming, who retired from the NBA in 2011. He was one of the tallest NBA players in history, measuring 7 feet 6 inches (about 228.6 cm) tall. Is the roller coaster safe for him? Explain. **[This depends on the data; since the answer can vary, it is very important that students justify their response in their team poster.]**

1-29. Is the roller coaster safe for all riders? Prepare a poster that shows and justifies your team's answer to this question. Every team poster should include:

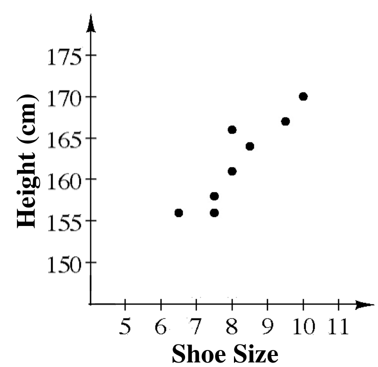
- A large, clear graph.
- A complete, clear, and convincing explanation of why your team thinks the ride is or is not safe for all riders.

Review & Preview

1-30. Kerin discovered that a human's height is related to his or her reach. Kerin is curious if the same thing is true for foot size.

a. It was not practical for Kerin to measure her classmates' feet, so Kerin collected the following shoe-size data from some of her classmates. Make a graph with appropriately scaled axes. **[See sample graph at right below; an appropriate *x*-axis might range from 5 to 11, and an appropriate *y*-axis from 150 cm to 175 cm.]**

Shoe Size	Height (cm)
6	153
8	160
7.5	155
8.5	161
8	168
8	166
8.5	164
6.5	156
10	170
9.5	167
7.5	158
7.5	156
8	161



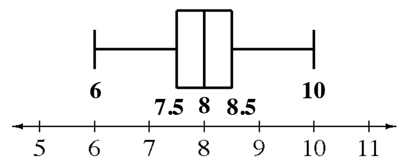
b. Is there a relationship between shoe size and height? **[Yes, students with larger shoe sizes tend to be taller.]**

1-31. One important statistical display is a box plot. If you need help remembering what a box plot is, refer to the glossary before you complete parts (a) through (d) below.

a. What is the median shoe size in problem 1-30? The minimum shoe size? The maximum? **[median = 8, minimum = 6, maximum = 10]**

b. What are the quartiles (the median of the upper half, and the median of the lower half)? **[first quartile = 7.5, third quartile = 8.5]**

c. Above a number line, plot the five numbers you found in parts (a) and (b) and then create a box plot. **[See box plot at right.]**



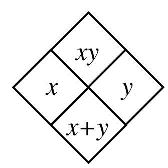
d. Where does your own shoe size fall in the distribution of Kerin's classmates? **[Answers vary.]**

1-32. Latisha is determined to do well in school this year. Her goal is to maintain at least an 85% average (mean) in all of her courses.

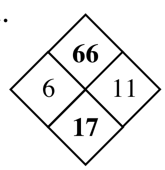
a. Latisha started her history class with two scores on tests, 72% and 89%. Confirm that the mean of these two scores is 80.5%. Show your work. **[$(72+89)\div 2=80.5$]**

b. Latisha's third score was 90%. Use her scores from part (a) to figure out her mean now. Be sure to show your work. **[$\approx 83.67\%$]**

1-33. On your paper, copy the Diamond Problems below and use the pattern you discovered earlier to complete each of them. The pattern is shown at right. Some of these may be challenging! **[See answers in bold in diamond below.]**



a.



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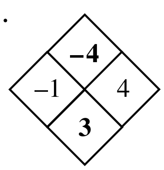

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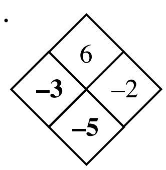

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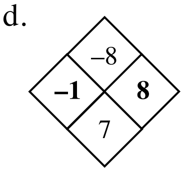
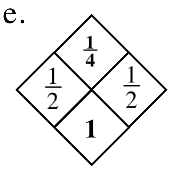
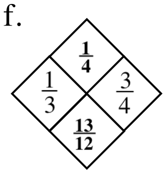


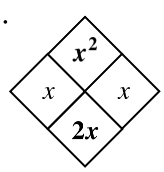
e.



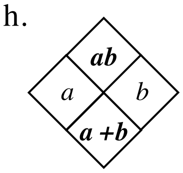
f.



g.



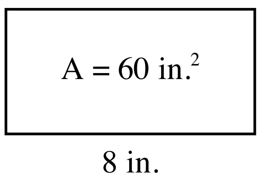
h.

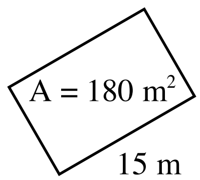


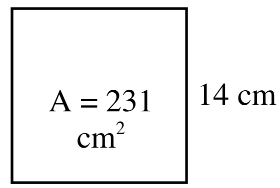
1-34. Compute *without* using a calculator.

a. $-15+7$ **[–8]**	b. $8-(-21)$ **[29]**	c. $6(-8)$ **[–48]**
d. $-9+(-13)$ **[–22]**	e. $-50-30$ **[–80]**	f. $3-(-9)$ **[12]**
g. $-75-(-75)$ **[0]**	h. $(-3)+6$ **[3]**	i. $9+(-14)$ **[–5]**
j. $28-(-2)$ **[30]**	k. $-3+(-2)+5$ **[0]**	l. $3+2+5$ **[10]**

1-35. The area of each rectangle below is shown in the middle of the rectangle. For each figure, find the missing length or width.

a. 

b. 

c. 

1-36. Without using a calculator, compute the value of the following expressions.

a. $\frac{3}{7} \div \frac{2}{3}$
[$\frac{9}{14}$]

b. $1.2 \div 0.04$
[30]

c. $\frac{11}{4}$ of $\frac{3}{7}$
[$\frac{33}{28}$]

d. $4.16(0.2)$
[0.832]

1-37. Latisha earned an 85% on her test today. Her previous scores were 72%, 89%, and 90%. Calculate her new average (mean). **[(72 + 89 + 90 + 85) ÷ 4 = 84%]**

1-38. Consider this data: 22, 15, 30, 51, 27, 33, 19.

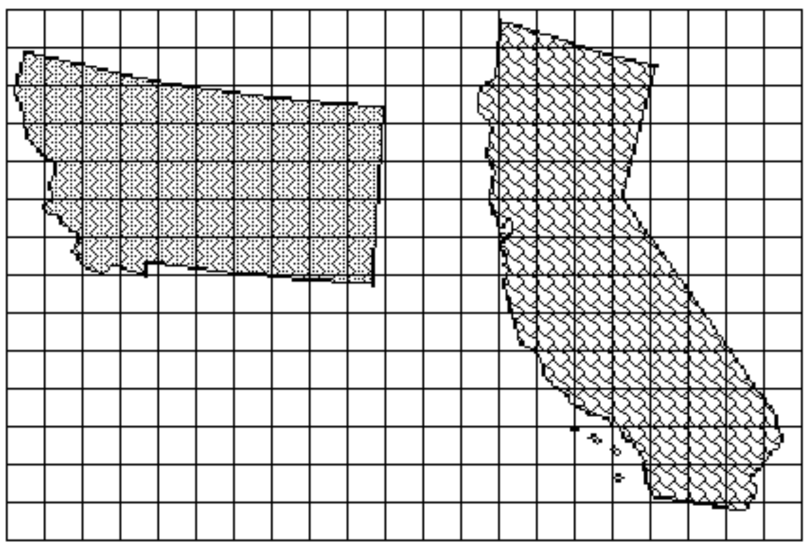
1	**5**	**9**
2	**2**	**7**
3	**0**	**3**
4		
5	**1**	

a. Arrange the data into a stem-and-leaf plot. (Refer to the glossary if you need a reminder of what a stem-and-leaf plot is.)
[See stem-and-leaf plot at right.]

b. Find the mean and median.
[mean = $\frac{197}{7} \approx 28.14$, median = 27]

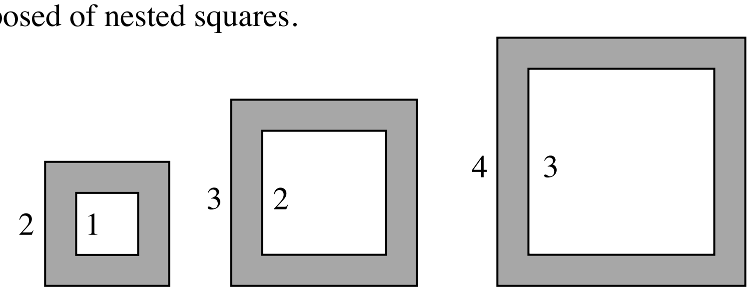
c. If the value 51 was replaced with 33, which measure(s) of central tendency would change and which would not? Explain. **[The mean would be lower and the median would remain unchanged.]**

1-39. Estimate the areas of Montana and California using the grid below. Which state has the greatest area? Compare the area of Montana to the area of California. Explain how you estimated the area of each state. **[MT ≈ 45 sq. units, CA ≈ 51 sq. units]**



1-40. The pattern below is composed of nested squares.

a. Draw the next figure in the pattern.
[A 5-unit square with a 4-unit square inside it.]



b. Find the area of the shaded region for the figure you drew in part (a). **[9 un^2]**

Comprehensive Support

CPM coaches can work with individual teachers, entire math teams, or a combination of both. There are several options available to choose from. The focus can be determined by the teacher and their coach or collaboratively by the team and the administration.

Options for Comprehensive Support

Individualized On Site Coaching
A CPM Coach can work with your teachers once every two weeks. Each visit will include a pre-conference, one observation period in their classroom, and a post conference. CPM Coaches can also work with entire math teams in an after school or early release setting, once per month. Virtual support is available between visits and meetings.

Visitations with Virtual Support
A CPM Coach will visit your teachers once a month or quarter with virtual support between visits. Each visit will include a pre-conference, one observation period in their classroom, and a post conference. This is a little different than coaching because it does not happen as frequently as coaching would.

Personalized Plan
CPM will work with your leadership team to design a personalized plan to best meet your needs.

Monthly Math Team Facilitation
A CPM Coach will facilitate the monthly meetings with a focus to be determined by the Math Team, the Administrators and the Coach. This plan can include CCSSM practices/adoption, lesson study, effective teams, articulation or whatever the needs might be.
Support may include:
Observations, Co-teaching, Videotaping, Analysis of student work, Facilitation of vertical articulation, Observation of a colleague and more.

Why provide Comprehensive Support?
The benefits of coaching are many: teachers with support tend to change their practice, coached teachers are more thoughtful in implementation of new practices, coaching results in long-term retention and implementation of strategies, teachers are more transparent with students about why things are changing, and they have more clarity in how to effectively implement new strategies.

For more information, contact:
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