CPM Algebra 2 Connections
Mathematical Practices

Introduction
The CPM *Connections* curriculum, developed from 2003-10, mirrors the elements of the CCSS Mathematical Practices. The principles of CPM course design—problem-based lessons, collaborative student work, and spaced practice—are based on the methodological research for teaching mathematics that leads to conceptual understanding. As such, the mathematical practices, similar to previous "best practices" such as the Marzano Principles or CPM's "Ways of Thinking" (see below), are integral to the pedagogy used throughout all of the courses. Task designs ask students to create models, make connections and explain their work regularly. Students are held responsible for high academic rigor, analysis, and critical thinking, and communicate their mathematical findings in writing and/or oral presentations in a clear and convincing manner.

Contents of this resource:

Sample lesson (detailed)
Page 2 presents a detailed review of one lesson from *Algebra 2 Connections* that shows how the eight Mathematical Practices are woven into it.

Selected lessons for review of embedded Mathematical Practices
Page 3 offers two-dozen lessons that the reader can review to see the embedded Mathematical Practices. CPM editors have created a table to indicate which practices are in the lesson and to what degree. The reader should examine the detailed sample lesson on page 2 before examining any of these lessons. Keep in mind that this list is a **sampling** of lessons where you will find the mathematical practices. Elements of the Mathematical Practices are present in most lessons.

CPM's "Ways of Thinking" mirror the Mathematical Practices
The CPM *Connections* courses each focus on five mathematical ways of thinking that are similar or identical to the CCSS Mathematical Practices. Page 4 explains the connection in detail.

Integrating each Mathematical Practice into CPM courses
The paragraphs on pages 5 and 6 discuss in detail how each Mathematical Practice is integrated into the structure of the CPM courses.

Additional resources:
CCSSM Content Standards, Supplemental Lessons, and Pacing Guides
(1) Correlations: There is a separate document that has correlations to the algebra 2 content standards. Be sure to read the list of abbreviations for the coding used in the citations near the top of the first page. **Most references are to lessons in the student textbook.**
(2) Supplement: Note that the other references are all available in the *Algebra 2 Connections CCSSM Supplement* booklet (available February 2011) or via download at the CPM website. These topics provide the additional content—beyond the textbook—required to meet the CCSSM content standards for this course.
(3) Pacing guide: There is also a CCSSM table of contents file for *Algebra 2 Connections* that shows which lessons may be omitted and where the supplementary lessons should be inserted.

Example of How Practices are Integrated Throughout a Lesson in *Algebra 2 Connections*

A typical CPM lesson exemplifies how deeply the CCSS *Standards for Mathematical Practice* are integrated into the course even though the course predates the CCSS practices. In Lessons 2.1.2 and 2.1.3 in CPM *Algebra 2 Connections* ("The Bouncing Ball"), students work in their collaborative teams to make mathematical sense of an inquiry into exponential equations that examines the bounce of balls. In Problem 2-20, students are asked to measure given balls' bounciness. But first they must make sense of what "bounciness" means mathematically (Practice 1 and Practice 4). They soon realize that there are several units of measure they can use, but quickly recognize that instead of converting to a common unit, it is the *ratio* of the bounce heights that is relevant (Practice 6 and Practice 1). Then in Problem 2-21 students are given their own "unknown" ball and asked to experiment with it to find its bounciness. When collecting data, students must attend to and coordinate what and how to measure (Practice 5), as well as tend to issues of precision (Practice 6). Back at their desks in Problem 2-22, students make decisions about how to best mathematically model the physical data using a table, graph, and an abstract equation (Practice 2 and 4). In Problem 2-23 students look for structure in the three representations of their model (Practice 7). Students make sense of and persevere in this day's lesson (Practice 1) by constructing arguments and defending them in their collaborative teams and—toward the end of the day—in a whole-class discussion (Practice 3).

The lesson continues the next day with Problem 2-31 in which students make predictions about multiple bounces from the mathematical model they create from their data of the previous day (Practice 4). They then test their predictions in Problem 2-32 by physically bouncing the ball multiple times (Practice 2 and Practice 6). In Problem 2-33 students make sense (Practice 1 and Practice 2) of applying a new model—an exponential one—to their data (Practice 4). In Problem 2-34, students make predictions using theoretical model, but also look at the limitations of their abstract model in comparison with their quantitative experimental data (Practice 2). In the next day's lesson, students investigate the structure of the three representations of linear functions and compare them with the structure of exponential functions (Lesson 7). The entire lesson is done with students constructing viable arguments and critiquing the reasoning of others in their collaborative teams and as a whole class (Practice 3).

Other Examples for Review—A Partial List

The CCSS *Standards for Mathematical Practice* are regularly integrated into the course design of CPM *Connections*. **The list below is by no means exhaustive (the course has about 135 lessons); it illustrates typical lessons that demonstrate the practices in action. These citations are just a few examples of where the mathematical practices are integrated into the course.**

An "xx" in the table below represents a practice that is a **focus** of the lesson. An "x" represents a practice that is **present** in the lesson.

A FEW EXAMPLES OF THE INTEGRATION OF CCSS PRACTICES INTO CPM CURRICULUM

	CCSS Standards for Mathematical Practice							
	1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**
Chapter 2 - Sequences and Equivalence								
2.1.2, 2.1.3 The Bouncing Ball	xx	xx	x	xx	x	xx	x	
2.2.1 Are They Equivalent?	x	xx	x	xx			xx	
Chapter 3 - Exponential Functions								
3.2.1 Curve Fitting and Fractional Exponents					x	xx	xx	xx
3.2.1 Systems of Exponential Functions	xx	x	x	xx	xx	x		
Chapter 4 - Transformation of Parent Graphs								
4.1.2, 4.1.3 Parabola Investigation	xx		x		xx		xx	xx
4.1.4 Modeling with Parabolas	xx	xx	x	xx	xx	x	x	
Chapter 5 - Solving and Intersections								
5.2.1 Solving Inequalities	x		x		xx		xx	xx
5.2.3 Systems of Linear Inequalities	xx	xx	xx	xx	xx	x	x	
Chapter 6 - Inverses and Algorithms								
6.1.3 Finding Inverses Algebraically	x		x		x		xx	xx
6.2.1 Inverse of an Exponential Function	xx		x		xx	x	xx	xx
Chapter 7 - 3-D Graphing and Logarithms								
7.1.5 Systems of Three Equations	xx		x	xx	x	x	xx	
7.2.4 Who Killed Dr. Dedman?	xx	xx	xx	xx	xx	x		
Chapter 8 - Trigonometric Functions								
8.1.1, 8.1.2 Cyclic Models	xx	xx	x	xx	x		x	xx
8.2.4 Graph to Equation	xx	x	xx		x		xx	xx
Chapter 9 - Polynomial Functions								
9.1.3 Equations for Polynomials	xx		x		xx	xx	xx	x
9.2.3 Complex Numbers and Equations	xx		xx		x		xx	x
Chapter 10 - Probability and Counting								
10.1.2 Conditional Probability	xx	x	xx	x			x	xx
10.2.4 The Ice-Cream Shop	xx	x	xx	x			x	xx

CPM's "Ways of Thinking" mirror the Mathematical Practices

Rather than discretely introducing each mathematical practice as a topic to be learned, CPM integrates these practices throughout each lesson. One way these practices are threaded throughout the CPM *Connections* courses is through its focus on mathematical "Ways of Thinking." These Ways of Thinking represent common ways of working mathematically and thus are forms of mathematical practice. Ways of Thinking differ slightly per course due to the different nature of the content, but several are common across courses. For example, since an important mathematical practice is to regularly ask and answer questions such as "How do I know this is true?" and "Is this always true?", Reasoning and Justifying is one of the Ways of Thinking common to most *Connections* courses. Other Ways of Thinking found across multiple *Connections* courses include choosing a strategy, generalizing, visualizing and investigating. Ways of Thinking found in the *Connections* courses are listed below. (MC = *Making Connections* for middle grades, AC = *Algebra Connections,* GC = *Geometry Connections*, and A2C = *Algebra 2 Connections*.)

MC1: comparing, visualizing, describing and explaining, looking for multiple ways of seeing or doing, and sense making
MC2: generalizing, reasoning and justifying, reversing, choosing a strategy, visualizing
AC: justifying, generalizing, making connections, reversing thinking, and applying and extending
GC: investigating, examining, reasoning and justifying, visualizing, and choosing a strategy/tool
A2C: justifying, generalizing, choosing a strategy, investigating, and reversing

Specifically, many of the mathematical practices proscribed by the Core Content State Standards document directly relate to the Ways of Thinking. For example, "Make sense of problems and persevere in solving them" asks students to engage in a way of thinking captured by *sense making* (MC1), *making connections* (AC), and *investigating* (GC and A2C). The practice "reason abstractly and quantitatively" is represented by the Way of Thinking referred to as *generalizing* (MC2, AC, and A2C) and *comparing* (MC1). The practice "construct viable arguments and critique the reasoning of others" is emphasized with the Ways of Thinking *describing and explaining* (MC1), *reasoning and justifying* (MC2 and GC) and *justifying* (AC and A2C). Finally, the mathematical practice "use appropriate tools strategically" is addressed with the Ways of Thinking *looking for multiple ways of seeing or doing* (MC1), *choosing a strategy* (MC2 and A2C), and *choosing a strategy/tool* (GC).

In addition to encountering prompts in each closure section which require students to reflect on the different ways they used each Way of Thinking throughout the chapter, the text also highlights the regularity of each Way of Thinking by bolding the frequent instances where students are prompted for that form of thinking.

The CPM *Connections* series predates the CCSS *Standards for Mathematical Practice* by several years, yet the practices advocated by the *Standards* are naturally integrated as a core foundation of the CPM curriculum.

Each Standard of Mathematical Practice is Integrated into CPM

<u>Standard 1</u> of the CCSS *Standards for Mathematical Practice* requires students to **"Make sense of problems and persevere in solving them."** The *Connections* courses have students solve realistic, non-routine problems that are rich in mathematics on a daily basis. These guided investigations are not mere "word problems" that mimic examples of rules. By having students make sense of the problem, rather than being told how to solve a particular kind of problem step-by-step, CPM problems develop deep conceptual understanding of the mathematics, procedural fluency, and perseverance on a daily basis, in addition to teaching and using problem-solving strategies. The curriculum fosters strategic competence and adaptive reasoning in students.

<u>Standard 2</u> of the CCSS *Standards for Mathematical Practice* requires students to **"Reason abstractly and quantitatively."** In contrast to offering word problems at the end of each chapter, the CPM program generally presents mathematical ideas in contexts *first*, helping students make sense of otherwise abstract principles. Only then do students move on to abstraction and generalization using symbolic notation. Students are taught how to gather and organize information about these contextual problems, break them into smaller parts, look for connections to previous mathematics, and identify patterns and relationships that lead to solutions. Students are also asked to work in reverse, that is, create situations for abstract generalizations.

<u>Standard 3</u> requires students to **"Construct viable arguments and critique the reasoning of others."** In CPM *Connections* courses, students regularly share information, opinions, and their expertise in collaborative study teams. They work at tables where they have room to manipulate their learning materials and tools. They take turns talking, listening, contributing, arguing, asking for help, checking for understanding, and keeping each other focused. More importantly, during this process students are using higher-order thinking: providing clarification, building on each other's ideas, analyzing and coming to consensus, and productively criticizing. Justifying and critiquing is a part of daily life in a CPM classroom, not an occasional assignment. For each problem, students are expected to communicate their mathematical findings in writing, in oral presentations, or in poster presentations in a clear and convincing manner. Teachers answer students' questions, but do so in a manner that challenges and motivates students to develop and test solutions themselves.

<u>Standard 4</u> has students **"Model with mathematics."** Modeling contextual situations with multiple representations is a recurring theme in the CPM *Connections* series. For example, from their earliest work with proportions and linear functions all the way through the more complex functions of later courses, students consistently model functions using tables, graphs, equations, and narrative or diagrams. In creating these models, students make assumptions, then predictions, and then check to see if their predictions make sense in the context of the problem. Students regularly use area models to multiply fractions, multiply and divide polynomials, factor, and solve probability problems. In contexts involving variability in data, students learn that a model may not be perfect, yet can be very useful for describing data and making predictions. CPM students find that a calculator or computer can help them model repeated probabilistic experiments much more efficiently than actually conducting the experiment.

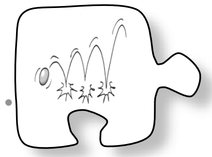
Standard 5 requires students to **"Use appropriate tools strategically."** In the typical CPM lesson, students have available to them a cornucopia of tools—from rulers and scissors, to tracing paper and graph paper, to blocks and tiles, to calculators—but are not typically told which specific tools to use to solve any particular problem. Indeed, a team of collaborating CPM students usually has a designated Resource Manager, whose task it is to ask the teacher for the tools their team needs for that lesson. It is not unusual for different teams to use different tools to solve a problem; during the course of the lesson students share with the whole class their solution strategies, and frequently this includes a lively discussion of which tools were most efficient and productive to solve a given problem. For problems where students are becoming fluent with algebraic procedures, the CPM *Connections* texts use an icon to indicate calculators should not be used. But during investigations students may choose to explore with their calculators to make sense of the mathematics without getting bogged down in computations. During various lessons, students might be exploring in a computer lab with programs provided by CPM, using motion detectors to determine rates, or using lasers or computer-based applets to demonstrate a point.

Standard 6 requires students **"Attend to precision."** Since they are solving contextual problems on a daily basis, the need for attending to precision soon becomes a natural consequence of being a CPM student. Whether they are converting the units in a problem to be consistent, or checking whether a numerical solution makes sense, dealing with precision in choosing units is inherent. Many CPM investigations make use of a calculator; using calculators extensively requires students to frequently attend to the precision of the results displayed. Since most problems are contextual, when students are symbolically solving problems, the mantra of "defining variables with units" becomes essential to coming up with a solution that makes sense. In the case of trigonometric or exponential situations, problems often require decimal approximations to make sense of the solution; CPM students find that approximations made in these situations may require higher levels of precision when evaluating expressions. They also determine that four decimal places of precision is useless when measuring angles in a garden plot.

Standard 7 requires students to **"Look for and making use of structure."** Since CPM students are developing deep conceptual understanding of the underlying mathematics, they frequently use this practice to bring closure to investigations. For example, cross-multiplying to find equivalent fractions is not taught simply as a procedure to be practiced, but is developed from the underlying structure of a multiplication table. Students develop deep conceptual connections between proportions, growth, steepness, and slope by exploring different manifestations of the structure of rates. CPM students do not simplify rational expressions by "canceling;" instead they use the underlying structure of the "Giant One"—fractions where the numerator and denominator are equal. Theorems in geometry are developed from the structure of repeated translations, not just listed in isolation. Polynomials are not multiplied and divided by following an algorithm, but by looking at the underlying structure of an area model. Moreover, polynomials are not solved by just following algorithms, but by looking at the structure of the factored form and the different kinds of roots that structure leads to.

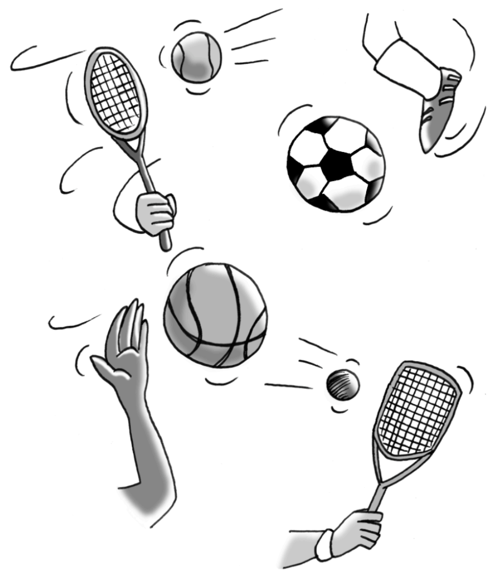
Standard 8 requires students to, **"Look for and express regularity in repeated reasoning."** When faced with a new investigation of a mathematical concept, CPM students often look for a simpler or analogous problem. By extending the structure of previous problems, students are continually expanding their ability to solve increasingly complex problems. At first students use repeated reasoning in multiplication tables to multiply fractions or find equivalent fractions. Students expand the reasoning of simpler intuitive probability problems into increasingly more complex probabilistic situations. CPM students observe repeated structure in area models and leverage that into the ability to multiply, factor, and eventually divide, polynomials. Students use repeated patterns to make sense of negative, zero, and fractional exponents, and to solve rational expressions. Repeated reasoning allows for increasingly complex geometric proofs to be developed from simpler ones and, more generally, by repeated building on conceptual understanding of previous underlying mathematics, make connections to continually and increasingly more complex situations.

2.1.2 How high will it bounce?



Rebound Ratios

In this lesson, you will **investigate** the relationship between the height from which you drop a ball and the height to which it rebounds.



2-20. Many games depend on how a ball bounces. For example, if different basketballs rebounded differently, one basketball would bounce differently off of a backboard than another would, and this could cause basketball players to miss their shots. For this reason, manufacturers have to make balls' bounciness conform to specific standards.

Listed below are "bounciness" standards for different kinds of balls.

- Tennis balls: Must rebound approximately 111 cm when dropped from 200 cm.
- Soccer balls: Must rebound approximately 120 cm when dropped from 200 cm onto a steel plate.
- Basketballs: Must rebound approximately 53.5 inches when dropped from 72 inches onto a wooden floor.
- Squash balls: Must rebound approximately 29.5 inches when dropped from 100 inches onto a steel plate at 70˚ F.

Discuss with your team how you can measure a ball's bounciness. Which ball listed above is the bounciest? **Justify** your answer.

2-21. THE BOUNCING BALL, Part One

How can you determine if a ball meets expected standards?

Your task: With your team, find the rebound ratio for a ball. Your teacher will provide you with a ball and a measuring device. You will be using the same ball again later, so make sure you can identify which ball your team is using. Before you start your experiment, discuss the following questions with your team.

What do we need to measure?

How should we organize our data?

How can we be confident that our data is accurate?

You should choose one person in your team to be the recorder, one to be the ball dropper, and two to be the spotters. When you are confident that you have a good plan, ask your teacher to come to your team and approve your plan.

2-22. GENERALIZING YOUR DATA

Work with your team to **generalize** by considering parts (a) through (d) below.

a. In problem 2-18, does the height from which the ball is dropped depend on the rebound height, or is it the other way around? With your team, decide which is the independent variable and which is the dependent variable?

b. Graph your results on a full sheet of graph paper. What pattern or trend do you observe in the graph of your data? Do any of the models you have studied so far (linear or exponential functions) seem to fit? If so, which one? Does this make sense? Why or why not?

c. Draw a line that best fits your data. Should this line go through the origin? Why or why not? **Justify** your answer in terms of what the origin represents in the context of this problem.

d. Find an equation for your line.

2-23. What is the rebound ratio for your team's ball? How is the rebound ratio reflected in the graph of your line of best fit? Where is it reflected in the rule for your data? Where is it reflected in your table?

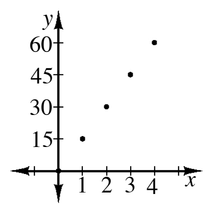
MATH NOTES

METHODS AND MEANINGS

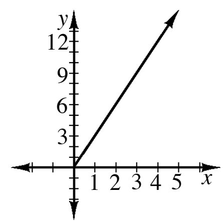
Continuous and Discrete Graphs

When the points on a graph are connected, and it *makes sense* to connect them, the graph is said to be **continuous**. If the graph is not continuous, and is just a sequence of separate points, the graph is called **discrete**. For example, the graph below left represents the cost of buying x shirts, and it is discrete because you can only buy whole numbers of shirts. The graph furthest right represents the cost of buying x gallons of gasoline, and it is continuous because you can buy any non-negative amount of gasoline.

Discrete Graph



Continuous Graph



Review & Preview

2-24. For each table below, find the missing entries and write a rule.

a.

Month (x)	0	1	2	3	4	5	6
Population (y)	2	8	32				

b.

Year (x)	0	1	2	3	4	5	6
Population (y)	5	6	7.2				

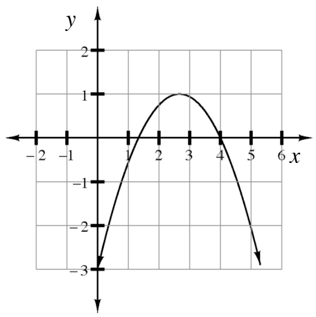
2-25. Solve each system of equations below. If you remember how to do these problems from another course, go ahead and solve them. If you are not sure how to start, refer to the Math Notes boxes in Lessons 2.1.1 and 2.1.3.

a. $y = 3x + 1$
$x + 2y = -5$

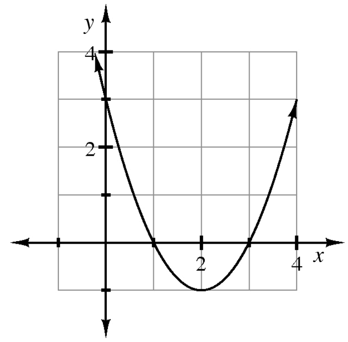
b. $2x + 3y = 9$
$x - 2y = 1$

2-26. Determine the domain and range of each of the following graphs.

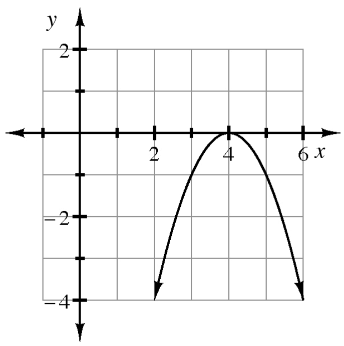
a.



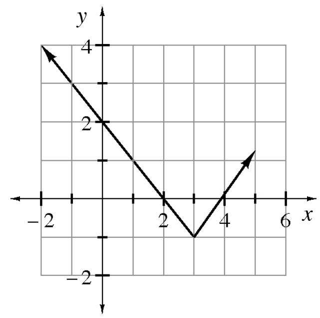
b.



c.



d.



2-27. Solve each of the following systems of equations algebraically. Then confirm your solutions by graphing.

a. $y = 4x + 5$
$y = -2x - 13$

b. $2x + y = 9$
$y = -x + 4$

2-28. Factor each expression below completely.

a. $x^2 - 2x - 63$

b. $2x^2 - 5x - 12$

2-29. Simplify each expression below.

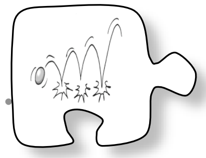
a. $\frac{6x^2y^3}{3xy}$

b. $(mn)^3$

c. $(3mn)^3$

d. $\frac{(3x^2)^2}{3x}$

2.1.3 What is the pattern?



The Bouncing Ball and Exponential Decay

In Lesson 2.1.2, you found that the relationship between the height from which a ball is dropped and its rebound height is determined by a constant. In this lesson, you will explore the mathematical relationship between how many times a ball has bounced and the height of each bounce.

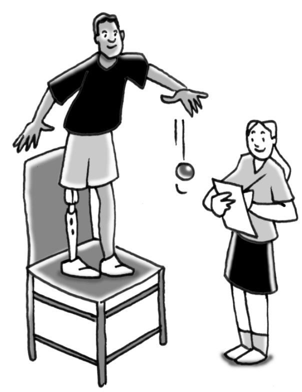
2-30. Consider the work you did in Lesson 2.1.2, in which you found a rebound ratio.

a. What was the rebound ratio for the ball your team used?

b. Did the height you dropped the ball from affect this ratio?

c. If you were to use the same ball again and drop it from *any* height, could you predict its rebound height? Explain.

2-31. THE BOUNCING BALL, Part Two



Imagine that you drop the ball you used in problem 2-21 from a height of 200 cm, but this time you let it bounce repeatedly.

a. As a team, discuss this situation. Then sketch a picture showing what this situation would look like. Your sketch should show a minimum of 6 bounces after you release the ball.

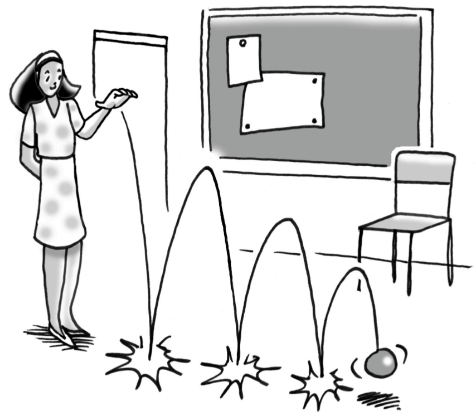
b. Predict your ball's rebound height after each successive bounce if its starting height is 200 cm. Create a table with these predicted heights.

c. What are the independent and dependent variables in this situation?

d. Graph your predicted rebound heights.

e. Should the points on your graph be connected? How can you tell?

2-32. THE BOUNCING BALL, Part Three



Now you will test the accuracy of the predictions you made in problem 2-31.

Your task: Test your predictions by collecting experimental data. Use the same team roles as you used in problem 2-21. Drop your ball, starting from an initial height of 200 cm, and record your data in a table. How do your predicted and measured rebound heights compare?

These suggestions will help you gather accurate data:

- Have a spotter catch the ball just as it reaches the top of its first rebound and have the spotter "freeze" the ball in place.
- Record the first rebound height and then drop the ball again from that new height.
- Catch and "freeze" it again at the second rebound height.
- Repeat this process until you have collected at least six data points (or until the height of the bounce is so small that it is not reasonable to continue).

2-33. What kind of equation is appropriate to model your data? That is, what family of functions do you think would make the best fit? Discuss this with your team and be ready to report and **justify** your choice. Then define variables and write an equation that expresses the rebound height for each bounce.

2-34. If you continued to let your ball bounce uninterrupted, how high would the ball be after 12 bounces? Would the ball ever stop bouncing? Explain your answer in terms of both your experimental data and your equation.

2-35. Notice that your **investigations** of rebound patterns in Lesson 2.1.2 and 2.1.3 involved both a linear and an exponential model. Look back over your work and discuss with your team why each model was appropriate for its specific purpose. Be prepared to share your ideas with the class.

MATH NOTES

METHODS AND MEANINGS

Solving Systems, Part 2: Elimination

In some situations, it may be easier to eliminate one of the variables by adding multiples of the two equations. This process is called **elimination**.

$$10y - 3x = 14$$
$$4y + 2x = -4$$

The first step is to rewrite the equations so that the *x* and *y* variables are lined up vertically. Next, decide what number to multiply each equation by in order to make the coefficients of either the *x*-terms or the *y*-terms add up to zero. Be sure that you can **justify** each step in the solution.

For example, consider the system above right.

You can eliminate the *x*-terms by multiplying the top equation by 2 and the bottom equation by 3 and then adding the equations, as shown below.

$$(10y - 3x = 14) \cdot 2 \rightarrow 20y - 6x = 28$$
$$(4y + 2x = -4) \cdot 3 \rightarrow \underline{12y + 6x = -12}$$
$$32y = 16 \quad \text{Adding resulting equations}$$
$$y = 0.5 \quad \text{Dividing}$$

Finally, substitute 0.5 for y in either original equation:

$$10(0.5) - 3x = 14$$
$$5 - 3x = 14$$
$$-3x = 9$$
$$x = -3$$

Thus, the solution to the original system is $(-3,\ 0.5)$.

Review & Preview

2-36. DeShawna and her team gathered data for their ball and recorded it in the table shown at right.

Drop Height	Rebound Height
150 cm	124 cm
70 cm	58.5 cm
120 cm	99.5 cm
100 cm	82.6 cm
110 cm	92 cm
40 cm	33.4 cm

a. What is the rebound ratio for their ball?

b. Predict how high DeShawna's ball will rebound if it is dropped from 3 meters.

c. Suppose the ball is dropped and you notice that its rebound height is 60 cm. From what height was the ball dropped?

d. Suppose the ball is dropped from a window 200 meters up the Empire State Building. What would you predict the rebound height to be after the first bounce?

e. How high would the ball rebound after the second bounce? After the third bounce?

2-37. Look back at the data given in problem 2-20 that describes the rebound ratio for an approved tennis ball. Suppose you drop a tennis ball from an initial height of 10 feet.

a. How high would it rebound after the first bounce?

b. How high would it rebound after the 12^{th} bounce?

c. How high would it rebound after the n^{th} bounce?

2-38. Solve the following systems of equations algebraically and then confirm your solutions by graphing.

a. $y = 3x - 2$
$4x + 2y = 6$

b. $x = y - 4$
$2x - y = -5$

2-39. Lona received a stamp collection from her grandmother. The collection is in a leather book and currently has 120 stamps. Lona joined a stamp club, which sends her 12 new stamps each month. The stamp book holds a maximum of 500 stamps.

a. Complete the table at right.

b. How many stamps will Lona have after one year?

c. Write an equation to represent the total number of stamps that Lona has in her collection after n months. Let the total be represented by $t(n)$.

Month	Stamps
0	120
1	132
2	
3	
4	
5	

d. Solve your equation for n when $t(n) = 500$. Will Lona be able to fill her book exactly with no stamps remaining? How do you know? When will the book be filled?

2-40. Determine whether the points $A(3, 5)$, $B(-2,6)$, and $C(-5,7)$ are on the same line. **Justify** your conclusion algebraically.

2-41. Serena wanted to examine the graphs of the equations below on her graphing calculator. Rewrite each of the equations in ***y*-form** (when the equation is solved for y) so that she can enter them into the calculator.

a. $5-(y-2)=3x$

b. $5(x+y)=-2$