



**SAN DIEGO CITY SCHOOLS**

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Department of Mathematics

**Instructional Module to Enhance the Teaching of**

**PRENTICE HALL**

**PRE-ALGEBRA**

**California Edition 2001**

**GRADE 7**

**Module 3**

**Decimals and Equations**

DRAFT COPY - PRENTICE HALL - GRADE 7 PREALGEBRA - DRAFT COPY  
**KEY MATHEMATICAL CONCEPTS FOR GRADE SEVEN -**

**"BIG IDEAS":**

By the end of grade seven, students will:

- Know the properties of, and compute with, rational numbers by manipulating numbers and equations. Know and use different representations of fractional numbers (fractions, decimals, and percents) and are proficient at changing from one to another. Understand and use factoring of numerators and denominators and properties of exponents.

*Note: Negative fractions are formally introduced and studied for the first time.*

- Increase their facility with ratio and proportion, compute percents of increase and decrease, and compute simple and compound interest.
- Graph linear functions and understand the idea of slope and its relation to ratio. Solve simple linear equations and inequalities over the rational numbers.
- Know the Pythagorean theorem and solve problems in which they compute the length of an unknown side.

*Note: The Pythagorean theorem is probably the first true theorem that the students will have seen.*

- Know how to compute the surface area and volume of basic three-dimensional objects and understand how area and volume change with a change in scale.
- Make conversions between different units of measurement. Know and use various forms of displays for data sets.

(Notes from Mathematics Framework for California Public Schools, Grade Seven, p149-152.)

**Key Mathematical Concepts Addressed: Chapter 3,  
DECIMALS AND EQUATIONS**

- **\*NS 1.2 Add subtract, multiply, and divide rational numbers and take positive rational numbers to whole-number powers.**
- AF 2.1 Use order of operations to evaluate algebraic expressions.
- MG 1.1 Compare measures in the metric system.
- MR 2.1 Use estimation to verify addition, subtraction, multiplication and division calculations.
- MR 3.1 Evaluate the reasonableness of the solution in the context of the original situation.

**MODULE 3: Decimals and Equations**

**DAY 1: LESSON 3–1, pp 121-126**

<b>LESSON FOCUS:</b>	Rounding and Estimating Decimals
<b>CA STANDARD:</b>	MR 2.1; MR 3.1
<b>Purpose of Lesson:</b>	At the end of the lesson, students will be able to round decimals and to estimate sums and differences
<b>Warm-up/ Routine(s):</b>	<u>Mental Math: Developing Number Sense.</u> Round to the nearest ten: 37    12    9    2    49    105    207    602    834    6009    3    45 <u>For Additional Support:</u> See <i>Skills Intervention Kit; Decimals, p. 3</i> Transparencies #1; Place Value #2; Tenths/hundredths on grid ALSO Tch. Trans. Bk. p4 - Place Value Chart
<b>LAUNCH:</b>  p. 122	P. 122, <i>Introducing the Concept:</i> Some real-world problems require estimated answers and others require an exact answer. <u>Partner Talk:</u> Decide which category (exact answer/estimated) each situation would fall into and be prepared to explain your thinking. <u>Examples:</u> Picking out a frame for your favorite poster An article about the number of teens living in San Diego County A fee required to purchase a license (drivers, fishing) Amount of cash to take with you when going to the mall
<b>EXPLORE:</b>  Ref. p. 122-124	By small groups, have students explore the following: (disregard tax) <b>Theresa wants to buy three CD's: \$15.95    \$15.75    \$16.15</b> She rounded each amount and decided she needed about \$45 without tax. Her best friend disagreed and said she had better have \$60. Her older brother said that both of them needed to estimate more closely and suggested the amount was more like \$50. On chart paper show how you think each person found their estimated amount. <i>What do you think Theresa should do? Explain your thinking.</i> For rounding examples, reference text pgs. 122-124.
<b>Practice:</b>	p. 125, students show/explain how the following estimated answers were found: <i>#5 the answer is about \$11; #8, about \$13.90; #11, about \$129</i>
<b>SUMMARIZE:</b>	QUICK WRITE: Estimate by Rounding. <i>Explain to a friend why <math>\\$4.89 + \\$3.37</math> should be about \$8.</i>
<b>Closure:</b>	Time to reflect back on the <b>purpose</b> of the lesson, and help students make <b>meaningful</b> connections.
<b>Homework:</b>	p. 126, #51 & 52; Mixed Review #54-61 OR Success-Building Puzzle & Prob. Masters, p14, <i>Making the Rounds</i>

**MODULE 3: Decimals and Equations**

**DAY 2: LESSON 3–2, pp 127-130**

<b>LESSON FOCUS:</b>	Estimating Decimal Products and Quotients
<b>CA STANDARD:</b>	MR 2.1
<b>Purpose of Lesson:</b>	At the end of the lesson, students will be able to estimate products and quotients and determine the reasonableness of a calculation.
<b>Warm-up/ Routine(s):</b>	<u>Mental Math</u> : Developing <u>Number Sense</u> . Routine/Warm Up Bank: <b>Mystery Number with Decimals</b> <u>Additional support</u> : <i>Daily Skills Warm-Up</i> transparency 3-2, TE p. 127
<b>LAUNCH:</b>	To begin dialogue, <i>Connecting to Students' Lives</i> , TE p127
<b>Ref. TE p. 127/128</b>	TE p. 128; <i>Part 1 Teaching Notes</i> - Recognizing errors in sales slips, etc. <u>Partner talk</u> : Josh bought 3 yd. of fabric to make a flag for his soccer team. It cost \$5.65/yd. The clerk said his total was \$14.95 before tax. <i>Did the clerk make a mistake? Explain. What would be a quick method to estimate the cost?</i>
<b>EXPLORE:</b>	Students work in small groups. Share out solutions & strategies. <i>Adam and Jessica are working on a budget for the school yearbook. They need to buy 18 rolls of film for the school camera and each roll costs \$4.79, about how much would that be before tax? (18x\$5 is about \$90)</i>
<b>Ref. p. 127-128</b>	<i>They also had a bill for shipping some of last year's books. They know that the average cost to ship one yearbook is \$3.12. The bill was for \$62.40. About how many books would have been in the shipment? (\$62/\$3 is about 20 books) If 100 yearbooks were shipped, about how much would the bill be? For a thousand yearbooks?</i> (Reference: p. 127, products; 128, quotients - <b>compatible numbers</b> )
<b>Practice:</b>	p129, #32-35
<b>SUMMARIZE:</b>	<u>Exit Slip</u> : <i>Explain how you would find a reasonable estimate for <math>14.90 \div 4.56</math>.</i>
<b>Closure:</b>	Time to reflect back on the <b>purpose</b> of the lesson, and help students make <b>meaningful</b> connections.
<b>Homework:</b>	p. 129, #26-31; p. 130; <i>Data Analysis</i> , #37-41

## MODULE 3: Decimals and Equations

### DAY 3: LESSON 3–4, pp 137-140

<b>LESSON FOCUS:</b>	Using Formulas
<b>CA STANDARD:</b>	AF 2.1
<b>Purpose of Lesson:</b>	At the end of the lesson, students will be able to substitute into formulas and use the formula to find perimeter of a rectangle.
<b>Warm-up/ Routine(s):</b>	<p><u>Mental Math</u>: Developing <u>Number Sense</u>.  <b>*Add game to Routines/Warm-Up Bank.</b>  <u>Multiplication Puzzler</u>: Find the missing number using estimation coupled with strategy of guess &amp; check.  <u>Example</u>: <math>4 \times \underline{\quad} = 87</math> (Teacher uses OH calculator to check.)  <math>4 \times 23 = 92</math>; <math>4 \times 22 = 88</math>; <math>4 \times 21 = 84</math>; <math>4 \times 21.5 = 86 \dots</math> to <math>4 \times 21.75 = 87</math>                      Additional examples: <math>5 \times \underline{\quad} = 96</math>; <math>6 \times \underline{\quad} = 106</math>; <math>4 \times \underline{\quad} = 63</math>; <math>8 \times \underline{\quad} = 98</math></p>
<b>LAUNCH:</b>  TE p. 137	<p>TE p. 137; <i>Connect to Students' Lives</i> - then use EXAMPLE 1, p. 137 to introduce formula: <math>d = rt</math> (Formula also on p. 121, <i>Transparency 46</i>)                      Reference: TE p. 137; <i>Background for the Lesson</i>.                      Small groups select &amp; solve one of the three <i>TRY THIS</i>, problems, p. 137. (<i>What operation is implied by writing <math>r</math> next to <math>t</math>, as in <math>rt</math>?</i>) Share results.                      Try to elicit from students formula for finding <b>perimeter</b>. If they are unfamiliar with this formula, demonstrate with a model (textbook) how length &amp; width can be found &amp; used to determine perimeter.</p>
<b>EXPLORE:</b>  <u>Materials</u> : 12-15 numbered rectangular objects, rulers, meter sticks	<p><b>PERIMETER STATIONS</b>: Arrange 12-15 numbered rectangular objects around the room. Students in partnership measure length and width to nearest <u>half centimeter</u> or <u>half meter</u> when appropriate &amp; use their measurements to find perimeter. Record in math notebook.                      Items may include: classroom, table, text, cereal box, novel, tag board, construction paper, post-it note, calculator, length of section of adding machine paper, band-aid box, etc.                      Materials: Partners will need a ruler (metric) &amp; meter stick.</p>
<b>Practice:</b>	<p>Given formula for the area of a rectangle: <math>A = lw</math>, choose three of the items that have been measured and find their areas.                      (Reminder: Express in square units.)</p>
<b>SUMMARIZE:</b>	<p><u>Partner Talk/Write</u>: If <math>2l \times 2w</math> finds the perimeter of a rectangular shape, what would be the formula to find the perimeter of a square?</p>
<b>Closure:</b>	<p>Time to reflect back on the <b>purpose</b> of the lesson, and help students make <b>meaningful</b> connections.</p>
<b>Homework:</b>	p. 139; #15-17; #20; p. 140, CHECKPOINT 1, #1-12

## MODULE 3: Decimals and Equations

### DAY 4: LESSON 3–5, pp 142-145

<b>LESSON FOCUS:</b>	Solving Equations by Adding or Subtracting Decimals
<b>CA STANDARD:</b>	NS 1.2 Key Standard
<b>Purpose of Lesson:</b>	At the end of the lesson, students will be able to solve one-step equations involving addition and subtraction of decimals.
<b>Warm-up/ Routine(s):</b>	<u>Perimeter Station Results</u> : On chart numbered, from 1-to the number of items used the previous day, call on different partnerships to share an item's perimeter that they calculated. Discuss results & any differences that may arise.
<b>LAUNCH:</b>  Ref. TE p. 142	Reflect back to seesaw/balance model (Teaching Transparency Book, p. 8) when solving an equation using adding & subtracting of whole numbers. Then extend thinking to solving equations with decimals. For subtraction, refer to TE p. 142; <i>Additional Example 1</i> . For addition, Alejandro's savings account shows a balance of \$467.89. He makes two deposits of \$54.62 and \$19.55. What is his balance now?
<b>EXPLORE:</b>	Students work with a partner then share with their table group.  p. 145; <i>MATH in the MEDIA</i> , Cartoon, #36 a and b.  <i>Critical Thinking</i> , p 144, #12
<b>Practice:</b>	p. 144; #7-10 Solving equations with decimal amounts.
<b>SUMMARIZE:</b>	<u>Table Discussion</u> : p. 145, <i>Error Analysis</i> , #33 Share out with whole class.
<b>Closure:</b>	Time to reflect back on the <b>purpose</b> of the lesson, and help students make <b>meaningful</b> connections.
<b>Homework:</b>	p. 144, #12, <i>Critical Thinking</i> , p. 145; #37-43 OR Success-Building Puzzle & Prob. Masters, p 29, <i>The Variable Bank</i>

## MODULE 3: Decimals and Equations

### DAY 5: LESSON 3–6, pp 146-149

<b>LESSON FOCUS:</b>	Solving Equations by Multiplying and Dividing Decimals
<b>CA STANDARD:</b>	NS 1.2 Key Standard
<b>Purpose of Lesson:</b>	At the end of the lesson, students will be able to solve one-step equations involving multiplication and division of decimals.
<b>Warm-up/ Routine(s):</b>	<u>Mental Math:</u> Developing <u>Number Sense</u> . Review: Toshio found the following prices for sports shirts: \$20, \$26, \$27, \$28, \$21, \$42, \$18 and \$20. Find the mean, median, & mode for the shirt prices.
<b>LAUNCH:</b> Ref. TE p. 146 p. 148	Ask students to talk with their table group what they know about the relationship between multiplication & division. Share out thinking. Ask for examples to help clarify for others. (TE p. 146; refer to <i>Background for the Lesson</i> .)  p. 148 walk students through #'s 1 and 2 - <b>model your thinking</b> . Then have student pairs share their thinking for p. 148, #'s 3-4.
<b>EXPLORE:</b>  Ref. p 149	<i>If you know a length in <math>l</math> meters, you can multiply the length by 3.28 to find the length in feet <math>f</math>. So 1 foot is about how much of a meter?</i> (a little more than one-third) Work together in small groups to solve: A) Write an equation to model this situation. B) A tree in my back yard is 7.5 meters tall; find its height in feet. C) A bookshelf in my den is 6 feet tall. What is its height in meters? D) Using a meter stick, measure our classroom and find its length & width. Find the $l$ and $w$ in feet. E) What would the area in feet be? ( $l \times w = \text{area}$ )
<b>Practice:</b>	Transfer multiplication/division skills to solving one-step equations. p. 148, #15, 19, 23, 27
<b>SUMMARIZE:</b>  <u>Materials:</u> 4 dice	Roll four dice. Make two of the numbers decimals (i.e. 2,4,0.5, 0.6). <i>Using multiplication &amp; division (if possible) &amp; any other operations make a new amount, <math>n</math>. Use all four numbers - write your equation - show your work.</i>
<b>Closure:</b>	Time to reflect back on the <b>purpose</b> of the lesson, and help students make <b>meaningful</b> connections.
<b>Homework:</b>	p. 148, #12-14, 20-22, 32-34

## MODULE 3: Decimals and Equations

### DAY 6: LESSON 3–5/6, pp 142-149

<b>LESSON FOCUS:</b>	Solving one-step equations by adding, subtracting, multiplying and dividing decimals.
<b>CA STANDARD:</b>	NS 1.2 Key Standard
<b>Purpose of Lesson:</b>	At the end of the lesson, students will better be able to solve one-step equations with decimals using all four operations.
<b>Warm-up/ Routine(s):</b>	<u>Mental Math: Developing Number Sense.</u> <i>Mystery Number with Decimals</i> - see Routine/Warm Up Bank
<b>LAUNCH:</b> p. 144 p. 148	p. 144, #13-15, <i>Mental Math</i> p. 148, #28-31, <i>Mental Math</i> May be used as quick review/mini-assessment.
<b>EXPLORE:</b>  Refer to TE p 145 and TE p. 149	This day can be used for Reteaching/additional practice in solving one-step equations with decimals OR Enrichment as you assess the need. Students could work as pairs taking turns as problem solver and coach. Suggestions: Reteaching: TE p. 145 (add & subtract) Reteaching: TE p. 149 (multiply & divide) Enrichment: TE p. 145, Patterns/Code;
<b>Practice:</b>	p. 148, 11 a. & b.
<b>SUMMARIZE:</b>	<u>Exit Slip:</u> <i>What two values will satisfy both equations?</i> $xy = 0.42$ and $x + y = 1.3$
<b>Closure:</b>	Time to reflect back on the <b>purpose</b> of the lesson, and help students make <b>meaningful</b> connections.
<b>Homework:</b>	p. 149, Number Sense, #36 p. 149, Mixed Review, #39-48

**MODULE 3: Decimals and Equations**

**DAY 7: LESSON 3–7, pp 150-157**

<b>LESSON FOCUS:</b>	Using the Metric System
<b>CA STANDARD:</b>	MG 1.1
<b>Purpose of Lesson:</b>	At the end of the lesson, students will be able to identify appropriate metric measures and convert metric units.
<b>Warm-up/ Routine(s):</b>	<u>Mental Math:</u> Developing <u>Number Sense.</u> $0.4n = 3.2$ $12 = \frac{m}{1.5}$ $\frac{s}{3.27} = -100$
<b>LAUNCH:</b>	Have students talk with one another about where they have seen metric measurements used. (Examples could be buying 2 liter bottles of soda, sports, i.e. track & field events, 6K races, medications, tools that are metric, road signs along highways in Mexico, etc.) Share information from p 150, <i>Background for the Lesson.</i> Discuss the chart <i>Identifying Appropriate Metric Measures.</i> Model or help students to visualize each unit.
<b>EXPLORE:</b>	P 151 Focus on chart, <i>Converting Units</i> and the most often used units (highlighted in yellow). <i>What do students notice as they read the measures from left to right? (Increases by multiple of ten.)</i> Students work with a partner to choose appropriate metric units: TRY THIS, p150, #1-4; p151, #5-6; Convert Units p152, #7-9
<b>Practice:</b>	P152, #10-11
<b>SUMMARIZE:</b>	<u>Partner Talk/Write:</u> <i>To convert one unit to another in the metric system, what operation would you use to go from a smaller unit to a larger unit? From a larger unit to a smaller unit? What relationship do the units have in common?</i>
<b>Closure:</b>	Time to reflect back on the <b>purpose</b> of the lesson, and help students make <b>meaningful</b> connections.
<b>Homework:</b>	CHECK UNDERSTANDING, p153, #1-11, #24-26

**MODULE 3: Decimals and Equations**

**DAY 8: LESSON 3–8, pp 159-162**

<b>LESSON FOCUS:</b>	Solve a simpler problem and apply strategy to more complex problems.
<b>CA STANDARD:</b>	MR 3.2
<b>Purpose of Lesson:</b>	At the end of the lesson, students will be able to solve a problem by applying the reasoning strategy of simplifying the problem.
<b>Warm-up/ Routine(s):</b>	<u>Mental Math: Developing Number Sense.</u> Daily Skills Warm-Up, TE p159, Lesson 3-8 <b>OR</b> Complete each statement: 0.25m = ___cm      ___ mL = 7.3L      595g = ___kg      875cm = ___m
<b>LAUNCH:</b>  p. 159-160	Give students "Snail Problem" from EXAMPLE 1. p. 159. Let them spend a few minutes attempting to solve the problem. Students share thoughts/strategies/organization methods. Share "Read" and "Plan" from p. 159. Suggest they solve a simpler problem similar to this one first. (You may wish to refer p. 160) Model the strategy/chart. Allow a few more minutes to solve. Have students turn to p. 160 and review strategy & solution diagram.
<b>EXPLORE:</b>  p. 161	p. 161, #1-7, Assign each small group a different problem. Give each group a blank transparency. Have each group solve the problem by making it a simpler problem first. On transparency, show work in terms of pictures (charts/tables), numbers and words. Share solutions with class. Explain thinking and reasoning
<b>Practice:</b>	p. 162, #10 & 12
<b>SUMMARIZE:</b>	<u>WRITE TO A FRIEND:</u> Write a note to a friend explaining how making a simpler problem is a helpful strategy in problem solving.
<b>Closure:</b>	Time to reflect back on the <b>purpose</b> of the lesson, and help students make <b>meaningful</b> connections.
<b>Homework:</b>	TE p. 153, #12-23 MIXED REVIEW, p 162, #13-21

## MODULE 3: Decimals and Equations

### DAY 9: ASSESSMENT

<b>LESSON FOCUS:</b>	Assessment of key standard - solving one-step equations involving addition, subtraction, multiplication and division of decimals
<b>CA STANDARD:</b>	NS 1.2 Key Standard
<b>Purpose of Lesson:</b>	<u>Assessment</u> : Students will demonstrate their understanding of the big ideas of the chapter of study.
<b>Warm-up/ Routine(s):</b>	<u>Mental Math</u> : Developing <u>Number Sense</u> . <i>Daily Skills Warm-Up Transparency</i> , TE p150
<b>LAUNCH:</b>  TE p 153, Daily Cumulative Review	Have students take out their Math Notebooks and open to previous day's homework, <i>MIXED REVIEW</i> , p 162, Share results for #19 & 20, discuss estimation methods used to solve the problems. Discuss strategies used to solve problem #21.
<b>EXPLORE:</b>	Chapter 3 Alternative Assessment <i>Chapter 3 Support File</i> , p 30
<b>Practice:</b>	P 134, #19 and p135, #30
<b>SUMMARIZE:</b>	<u>REFLECTION</u> : <i>What was the most important learning piece for you in this chapter? Why?</i> <i>What is the relationship between multiplication &amp; division of decimals?</i> <i>What is the relationship between units of the metric system? Example?</i>
<b>Closure:</b>	Time to reflect back on the <b>purpose</b> of the lesson, and help students make <b>meaningful</b> connections.
<b>Homework:</b>	p. 163, Multi-Step Application, Step 1 OR Success-Building Puzzle & Prob. Masters, p103, <i>The Glogs of Nog</i>