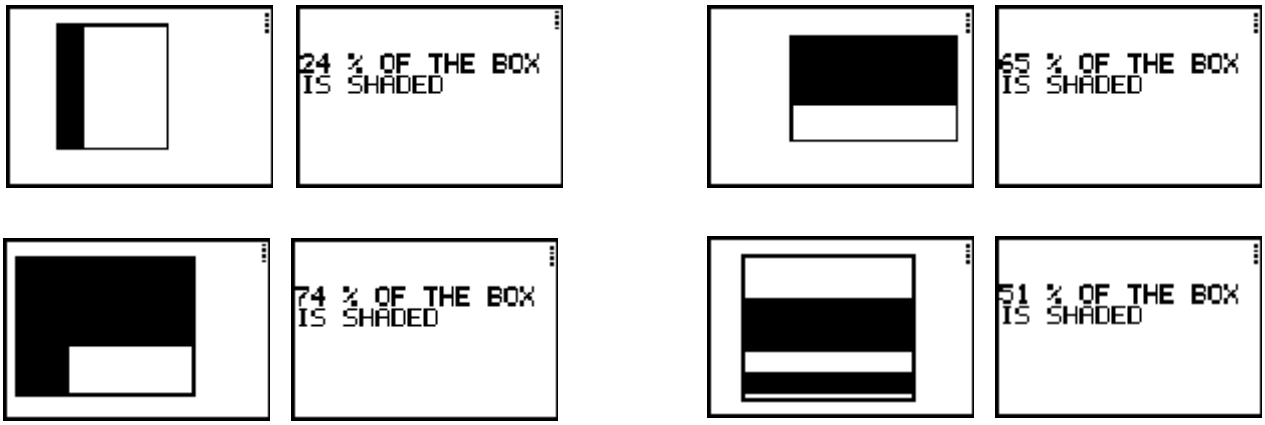
SHDBOXPR and SHDBOXQZ for the TI-73 & 83

Shade Box Practice and Shade Box Quiz are designed to help students to visually estimate the shaded portion of a rectangle as a part-to-whole ratio expressed as a decimal. When the program is executed, a random size rectangle is drawn which is then partially shaded a random amount. The program pauses to allow a student time to determine an estimate.



SHDBOXPR

In the Shade Box Practice program students are given the opportunity to practice many problems. A student is only asked to make a mental estimate before feedback is given. No answers are actually entered into the calculator.

SHDBOXQZ

The Shade Box Quiz program gives the student 5 problems (only three on the TI-73) and records the responses for later review. The estimates to five problems are saved in lists as well as how much each estimate differs from the actual ratio shaded and the average error per problem. The teacher can assign all students the same problem set or have each student do a different one, say whatever their birth date is multiplied by any arbitrary number. Yes, the student can enter the multiplication problem directly in response to the screen question "What Problem Set do you want?" The calculator will do the computation! After a student completes five problems, the following feedback screens below appear. Choose any Pic from the menu to review a problem.

Teacher Notes

The real value of this program is having students communicate how they determined their estimates. Keep probing to unveil the subtle differences in thinking strategies. Both you and your students will be surprised at the wide variety of methods used. Do they first estimate with fractional values and convert to percents? Do they visualize some landmark percents (0%, 25%, 50%, 75% and 100%) and make comparisons? Sometimes is it easier to estimate the unshaded portion and subtract from 100? Are they looking at the region (area) or just along one edge (linear)? How do they piece the striped boxes together?

The Think-Pair-Share cooperative learning strategy works really well with this activity. Each student does his or her own individual thinking on the Class Problem when deciding what estimate to enter in the calculator. They should then pair up and discuss their answers and, more importantly, their strategies with their partners. Ask each pair to reach a consensus answer. Begin the whole class sharing session with questions such as, "How many of you used a different thinking strategy than your partner? First tell us how your partner thought about it." This encourages students to really listen to each other. Turning to the other partner say, "Now you tell us how your partner thought about it. How did you reach a consensus?" A lot of mileage can be gotten from looking at one or two problem in depth as a class, then letting individuals try out what they learned from each other in practice sessions.

The teacher should also center discussion on part-part ratios as well as part-whole ratios. Even though the program has students entering answers as decimal values, discussion can involve common fraction/decimal/percent equivalencies. Encourage students to use denominators of 2,3,4,5,6,8,and 10 since these are the ones student should know spontaneously.

Also ask the students to be introspective, to think about their thinking. "Do you always use the same strategy, or are you flexible depending on what is shaded?" "Do you use any verification process before pressing the button?" "How close is good enough?" These and other metacognitive questions are included on a blackline transparency master.

Name _____

Problem Set # _____

Student Recording Sheet

Draw the shaded rectangle in the graphing calculator window in the same position and proportion as it appears on your calculator. Record both your estimate and the actual answer. Was your estimate close enough? Explain the thinking strategy you used first. Explain how you rethought about the problem after knowing the answer.

My Estimate: _____ Answer: _____

Is this close enough for you? ❑ Yes ❑ No

Original Thinking Strategy:

Rethinking:

SELF REFLECTIONS

- ✓ What strategies are you using?
- ✓ Are you using the same strategy every time?
- ✓ If you use a variety of strategies, what determines which one you use for any given problem?

- ✓ Do you use any verification process before pressing the enter button?

- ✓ How close is “good enough” for you?